THE PAPER INDUSTRY and PAPER WORLD

AN EDUCATIONAL NEWS MAGAZINE—MAY, 1947

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DETROIT

Modern, Integrated Facilities

Engineering • Patterns • Castings • Machining • Assembly • Testing

Downingtown Mfg. Co., Downingtown, Pa.

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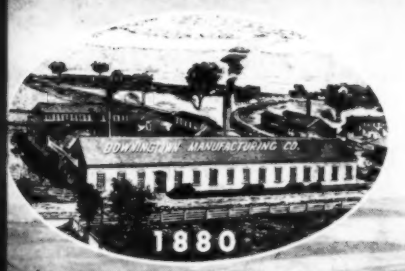
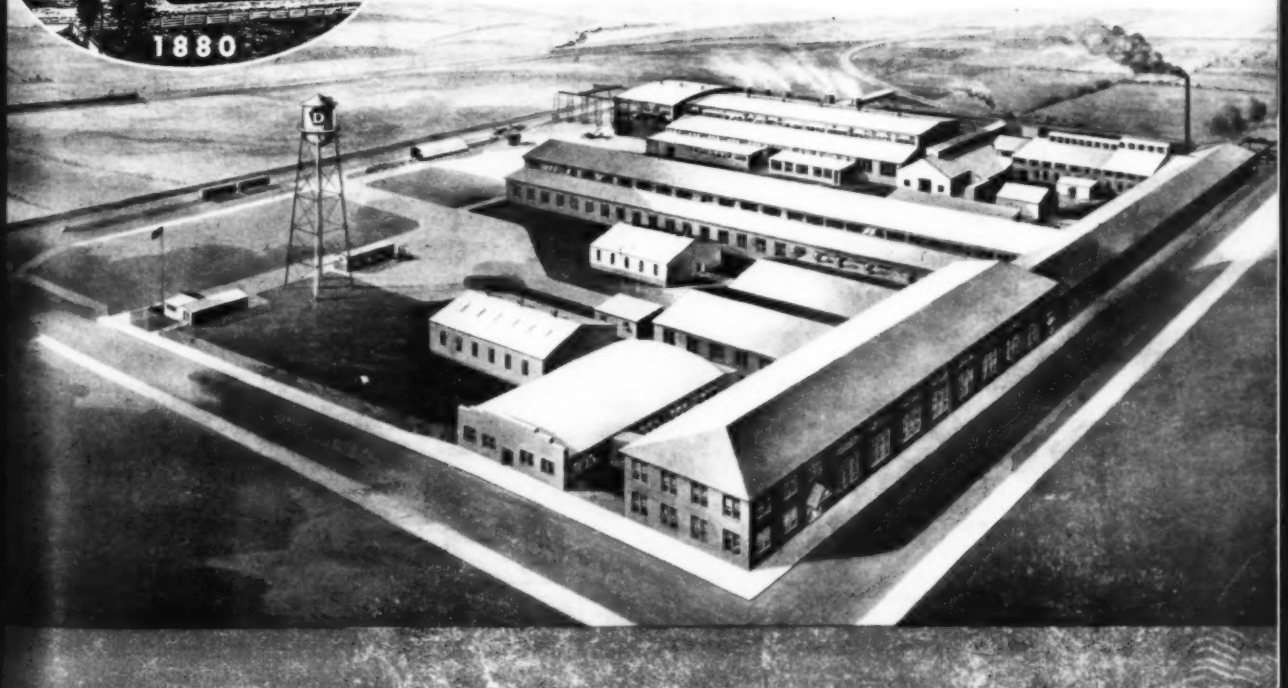
Paper Making Machinery





Where wet strength counts–

High wet strength of UFORMITE-treated paper is graphically shown by the fact that this paper bag when filled with water does not break even on prolonged soaking.

Photo courtesy Union Bag and Paper Company.

–count on UFORMITES 467 and 470 to do the job efficiently, economically!

Paper bags are just one of many applications where wet strength is of prime importance . . . and in which you can rely on the UFORMITES to give you superior wet strength efficiently and economically.

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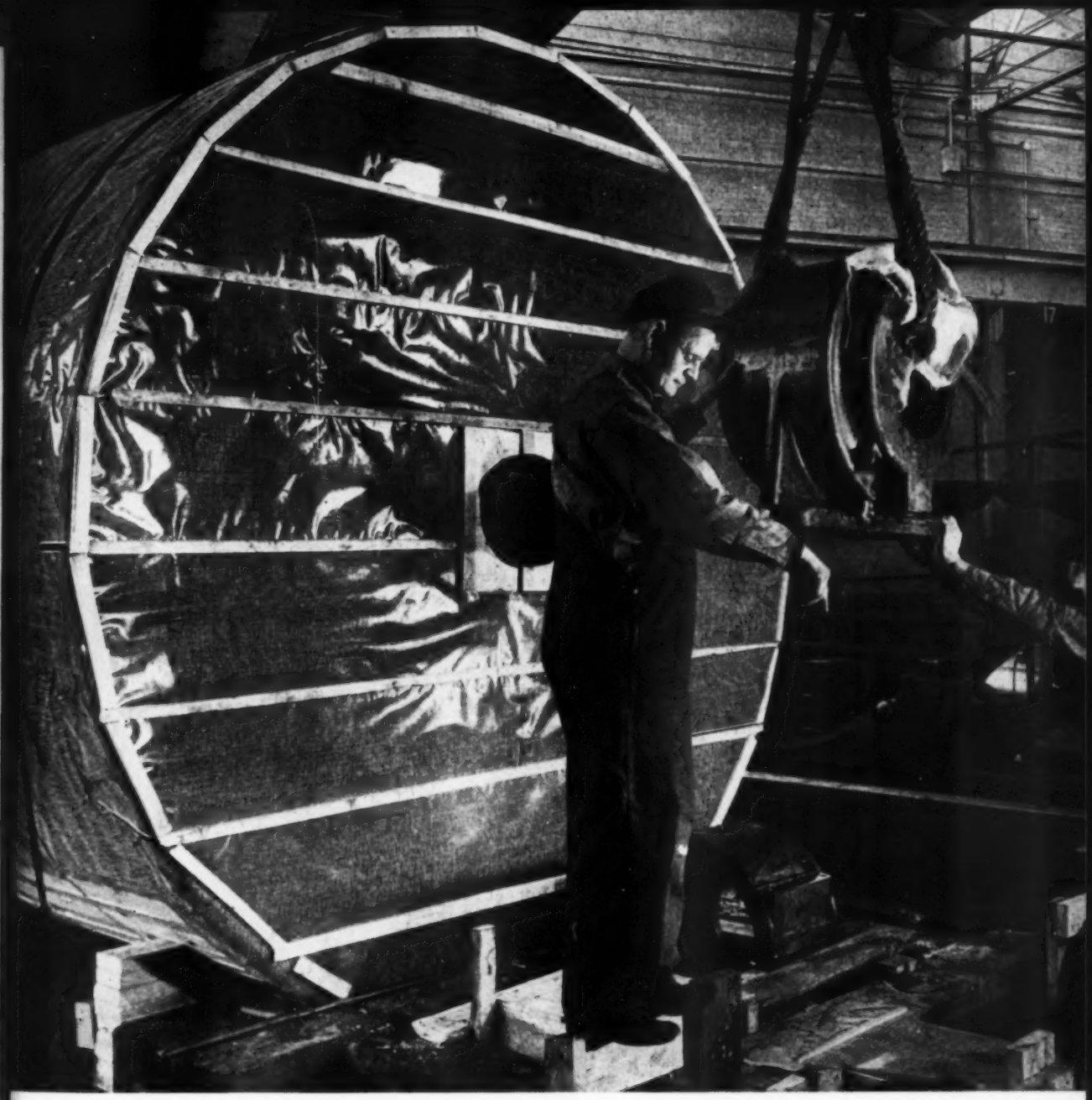

Another Yankee on the way

Blockers Peter Reynolds and John Carlson are seen on the shipping floor, loading a Yankee dryer and a bearing housing on a flatcar. The dryer is lagged for shipment. The first Yankee machine constructed in the U. S. A.—an 82″ tissue machine—was built by Beloit Iron Works in 1891. To ship a *complete* paper machine, a train of more than 100 cars is not unusual. *Beloit Iron Works, Beloit, Wisconsin.*

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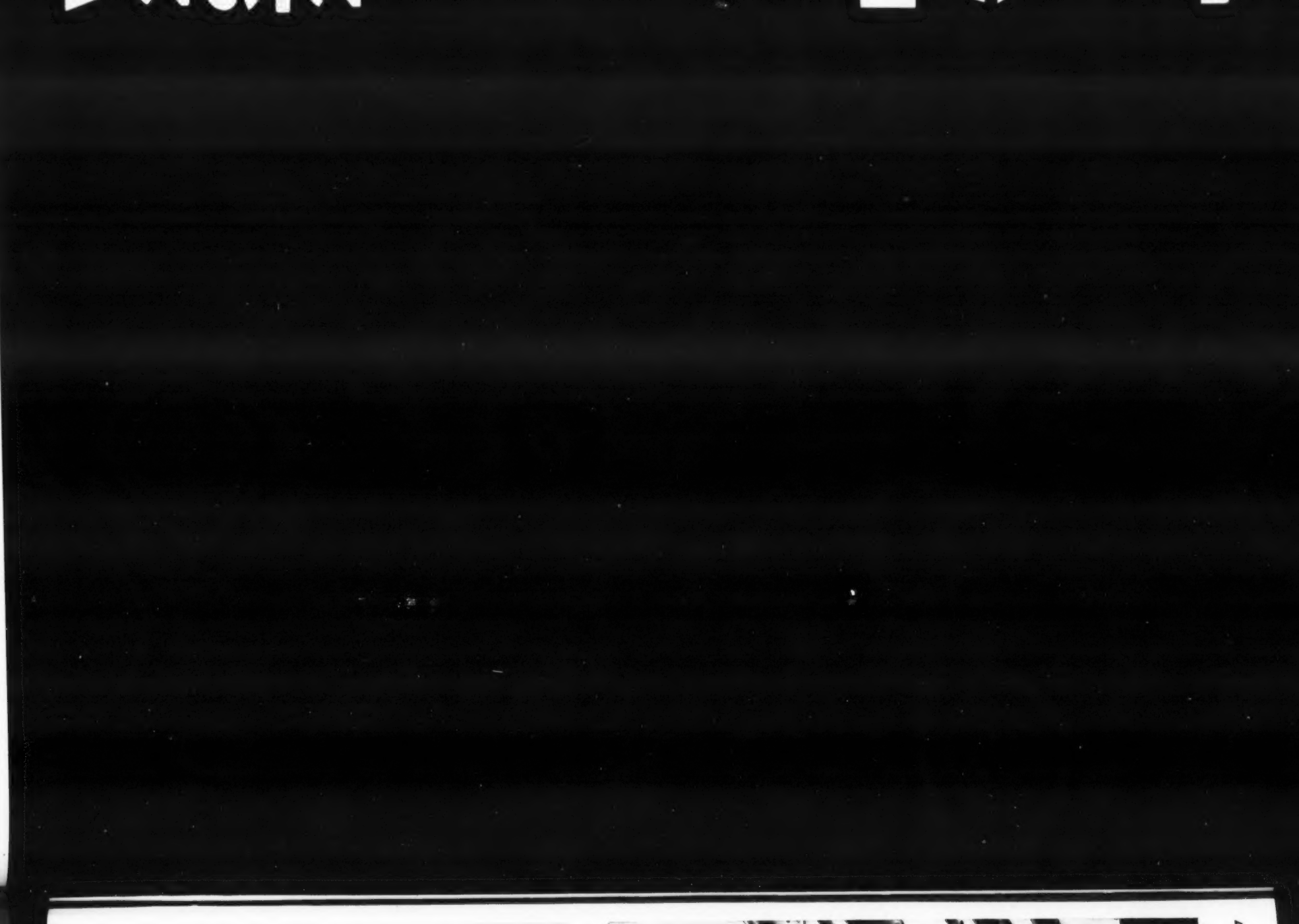

DIGESTERS

for the nation's PULP MILLS

The "behind the scenes" photo above is a typical view at a pulp mill. It shows a row of sulphate digesters at the Champion Paper and Fibre Company Mill at Canton, North Carolina. The digester to which the small inset view points, was just recently installed. It is 9 ft. 9 in. in diam. by 48 ft. 9½ in. and is shown, in the small view, being shipped from our Birmingham, Alabama, plant.

Digesters are typical examples of steel plate structures we build for pulp and paper mills. All three of our plants have facilities for stress-relieving and x-raying vessels in accordance with code requirements. Tanks and steel plate work at sulphite mills often require corrosion-resistant alloys. We can furnish tanks with special linings when mill conditions require it. All of the equipment we build for pulp and paper mills is designed and fabricated specifically for the job.

Write our nearest office for quotations when you require any of the steel plate structures listed below.

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(Reg. U. S. Pat. Off.)

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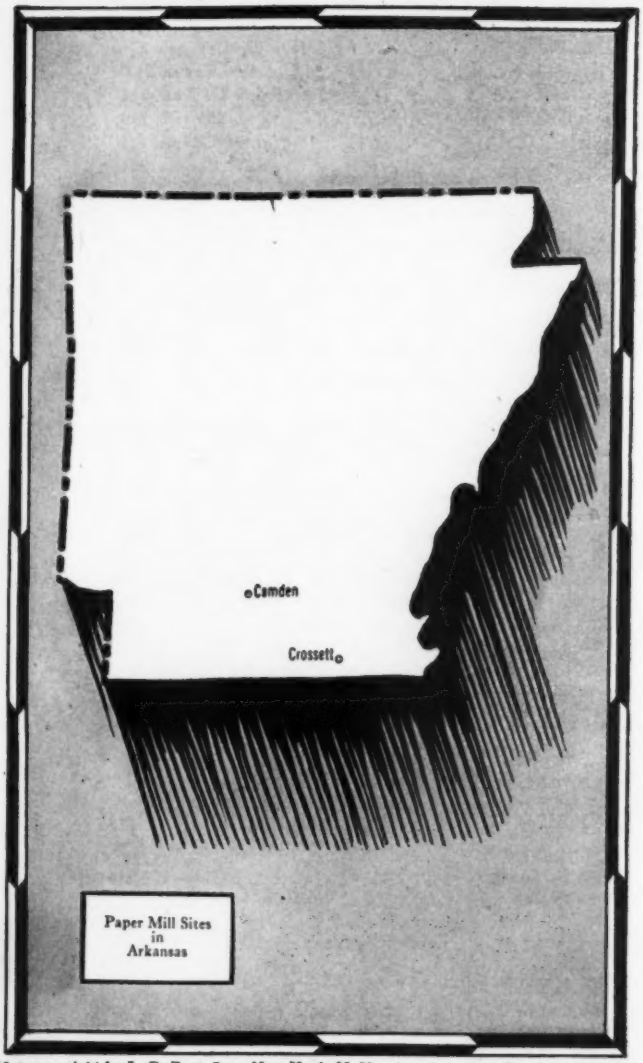
Draper's

ATLAS OF AMERICAN PAPERMAKING

No. 29 PUBLISHED BY DRAPER BROTHERS COMPANY • CANTON, MASSACHUSETTS



Map copyright by L. D. Post, Inc., New York, N. Y. American Map Co., New York, N. Y.

HIGH LIGHTS:

Arkansas is a newcomer in the paper industry. Its potentialities in raw materials are great. According to *The Americana*, the forested part of the State covers nearly three-fourths its area. The leading species of tree is short leaf yellow pine, but until its value as a pulpwood had been demonstrated, this asset of the State was overlooked by papermakers. Coal, limestone, clay and chalk also occur in the State, and natural gas as well. Four large tributaries of the "Father of Waters" flow through the State, which thus appears richly endowed with raw materials essential to the manufacture of paper.

At the present time only two paper companies operate in Arkansas. Both are large, self-contained units. The rated 24 hour production of one is 660,000 lbs. of Kraft specialties, produced on three Fourdriniers. Of the other the daily production is 400,000 lbs. of paper and 130,000 lbs. of paperboard, the output respectively, of one Fourdrinier and one cylinder machine. Both mills manufacture their own pulp. The former mill began to operate in 1928, the latter in 1936, amidst considerable criticism, now proven to have been shortsighted, of the Government loan which assisted in its promotion.

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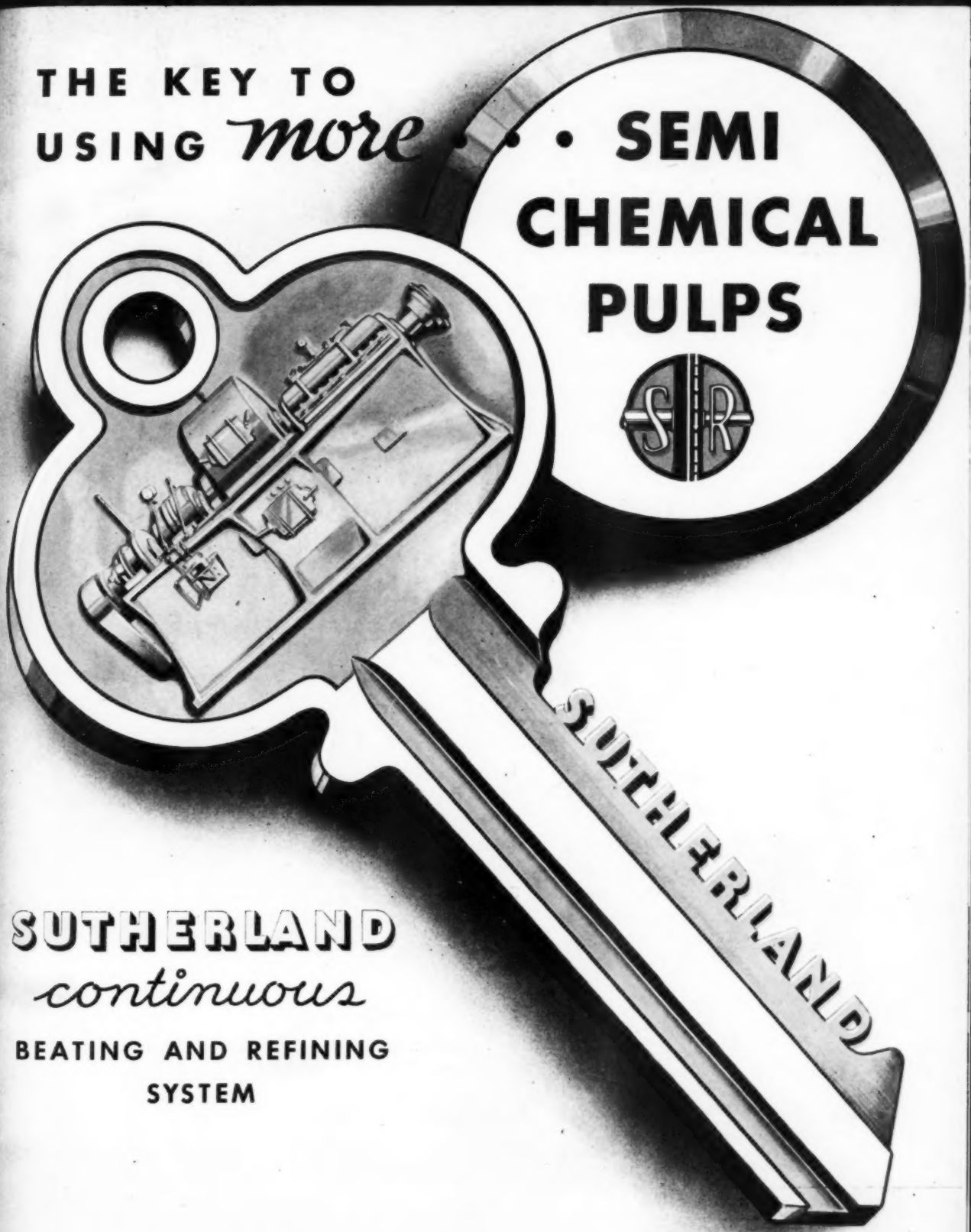

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... engineered to give GREATER steam velocity ... MORE UNIFORM surface temperature

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By restricting the steam to the shallow annular chamber formed by the inner and outer shells of the Lukenweld Jacketed Drier Roll, greater steam velocity results. Greater steam velocity reduces film, dead steam and air and improves heat transfer through the shell.

These advantages, plus the guiding feature of this narrow steam passage, result in the maintenance of a more uniform temperature across the face of the roll.

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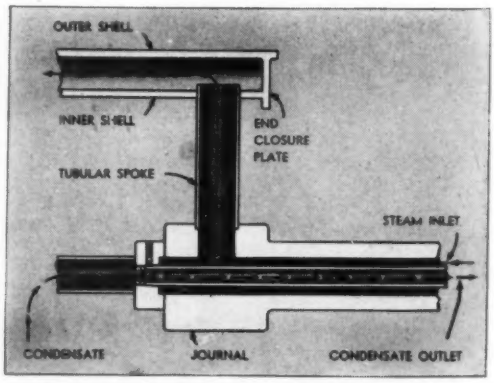
Complete information on the Lukenweld Jacketed Drier Roll is in Bulletin 358. For a copy please write to Lukenweld, Inc., Division of Lukens Steel Company, 408 Lukens Building, Coatesville, Pa.

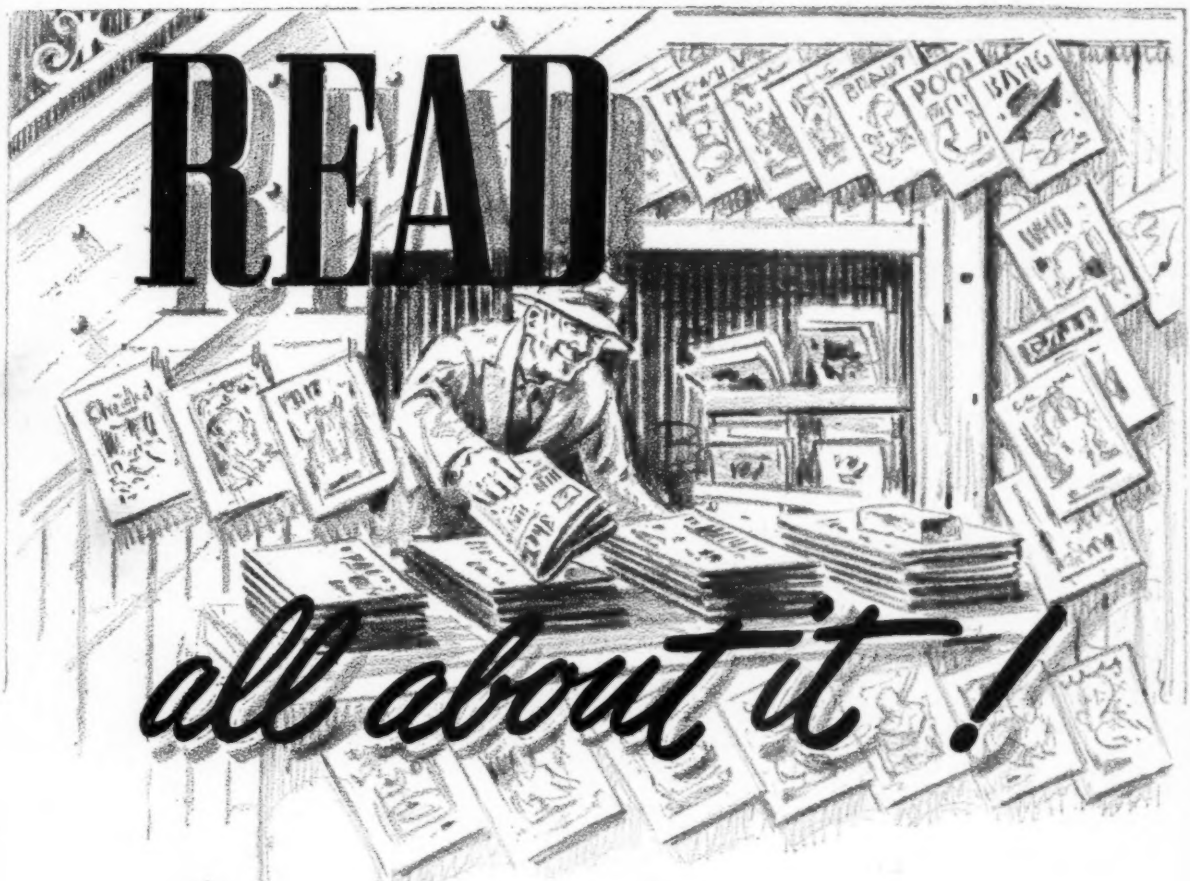


Typical design of Jacketed Drier Roll showing one-quarter section of roll.

LUKENS
LUKENWELD DIVISION

*From 2 ft. to 18 ft. O. D. and over.

DRIER ROLLS AND DRYING MACHINERY



And that's just what Mr. and Mrs. America are doing, for never has there been such a demand for magazines, newspapers, books, catalogs, and advertising matter. Paper manufacturers are continuing their splendid wartime efforts by running at full capacity to meet the record-breaking peacetime demand for paper and paper products.

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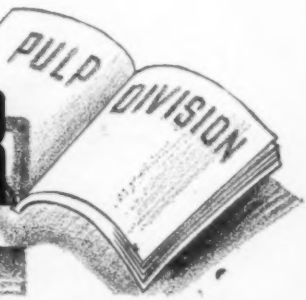

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Asbestos yarn woven into the face of Woodberry 887 re-enforced dryer felts, at scientifically determined intervals, protect the contact surfaces against wear, add to length of service, and reduce costs per ton of paper.

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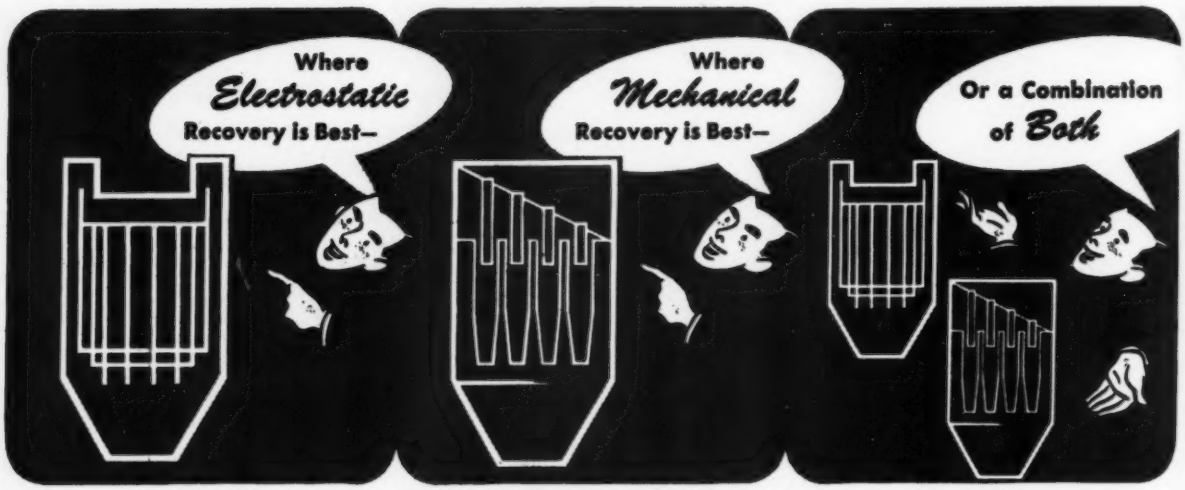

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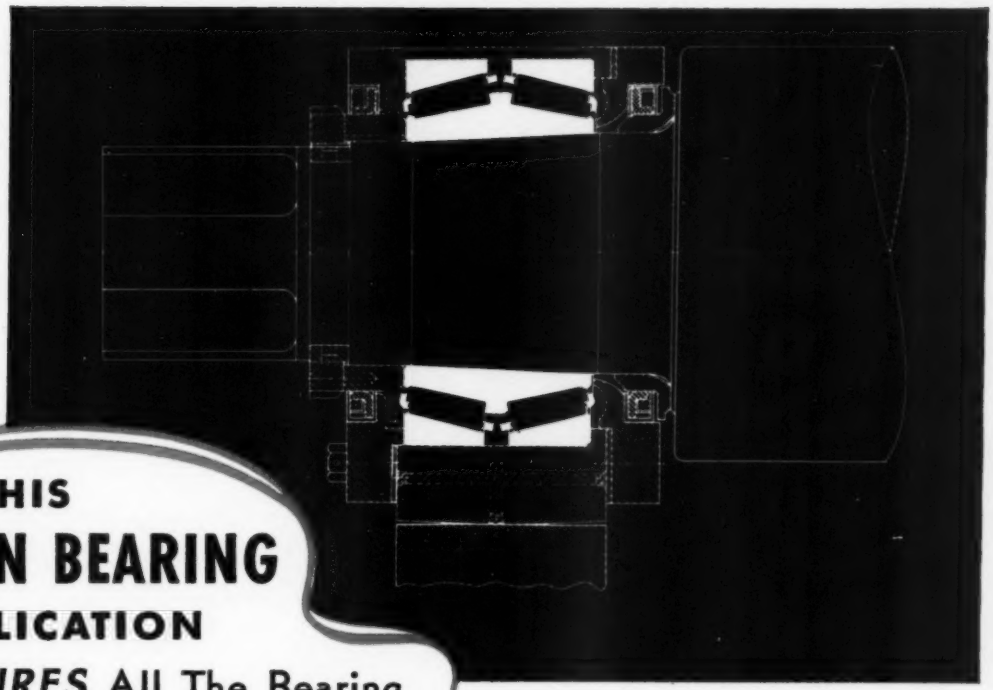

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First, because the bearings themselves are manufactured to extremely close precision tolerances.

Second, because the bearings are of Balanced Proportion Design, giving increased roll neck strength and rigidity; minimum roll deflection; and maximum radial, thrust and combined load capacity.

Third, because the bearings are mounted with a tapered bore on the calender roll shaft, making it much easier to assemble the bearings on the roll shaft and to remove them when necessary.

Fourth, because the calender rolls can be ground on the bearings, making the O.D. of the calender rolls virtually free from inaccuracies, due to the internal precision of the bearings.

Fifth, because Timken Tapered Roller design assures free rolling motion regardless of the R.P.M. of the bearing or the speed of the calender rolls.

Sixth, because only with an adjustable bearing—a Timken Bearing—is it possible to provide and maintain proper running clearance for any calender operating temperature.

These features make possible accurate and constant gap setting between rolls with resulting close control of product thickness; minimum operating and maintenance costs; and longer calender life. Specify Timken Bearings for your calenders and look for the trade-mark "TIMKEN" on every bearing you use. The Timken Roller Bearing Company, Canton 6, Ohio.

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Be Careful—
Every Month
of the Year
"SECOND GREEN CROSS FOR SAFETY CAMPAIGN BEGINS"
(See Page 238)
(Photo by Wally Kenneth; courtesy of National Safety Council)
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TRADE WINDS

Mexican Company Outlines Improvements in Two Mills

***EDITOR'S NOTE:** The accompanying news letter from Cia de las Fabricas de Papel, Mexico City was submitted for publication. The company operates two mills: (1) San Rafael and (2) Progreso Industrial. The story of operations and improvements at these mills is published here in the same form as submitted.*

▸▸▸ NOTWITHSTANDING difficulties created by the war, Cia de las Fabricas de Papel, Mexico City, is now installing new equipment, and many important changes are planned for the future.

San Rafael

In the San Rafael mill, a high percentage of its raw materials are produced, using Mexican wood species of which the most important are: "oyamel" (*Abies Religiosa*) a kind of fir, and "ocote" (*Pinus Moctezumae*) similar to southern pine. Some years ago, a department was established for the reforestation of the region, thus insuring a continuous supply of adequate pulpwood.

The groundwood mill produces about 100 tons of pulp per day in pocket grinders, using both natural and artificial stones. Part of this pulp is bleached with sodium hydrosulphite and the possible use of other bleaching processes (peroxides) is being studied.

A Chemipulper with six reaction chambers, Asplund defibrator, and a Roll-O-Finer have been installed to produce about 25 tons of pulp per day using sulphate liquor, or 30 tons without liquor, which pulp is used for some kinds of wrapping papers and boards.

The sulphite mill has a capacity of 30 tons of unbleached pulp per day and several new improvements are contemplated to bring it up to date.

In the near future, a kraft pulp mill will be put into operation using a new process. In this process, the cooking takes place continuously in a horizontal rotary digester. The process is a pat-

San Rafael mill of La Compania de las Fabricas de Papel, located on the slopes of the Volcano Ixaccihuatl

ent of Joaquin de la Roza. The recovery plant will be a Tomlinson unit, complete with all the latest improvements.

The raw materials and imported pulps are treated in a new central department for stock preparation. Pulps which require defibering are passed through Dilts Hydrapulpers or Sturtevant Bale Pulper, from which they are pumped to special tanks. From these tanks, the slushed pulps are sent to hydrating or refining machines in which they receive the treatments required for each one depending on the kind of paper to be made; they are afterwards stored in special tanks for treated pulps. From these tanks the pulp is pumped to mixing and measuring chests, and the size, alum, and color are added, leaving the stock ready to be sent to the paper machines. In the central department, there are the following stock preparing machines: one Noblewood mill, one Bauer refiner, three Jones No. 1, one Dilts Hydrafiner, six Morden's stock makers, and, recently, a Sprout-Waldron refiner has been installed.

This department handles 150 tons of pulp per day (groundwood, semi-chemical, sulphite, kraft, and many kinds of bleached pulps) with only three men on each shift, and furnishes stock for all grades of paper that must be made from the cheap wrapping papers to high quality bonds.

With this method of work, considerable savings have been made in labor and power, and the finished papers have been more uniform and of better quality.

In an effort to solve the constant problem of an inadequate supply of alum and china clay, the mill is making its alum from clay by the catalytic process with calcium flouride, and is also installing a new plant for the preparation of china clay, using the Dorr system.

The paper mill has nine paper machines of various widths, and a new Puseyjones machine is being installed, which it is expected will increase the production to 210 tons of paper per day. New supercalenders, cutters, and paper conditioning equipment are being installed to improve the quality of the finished paper. A large furnishing room provides ample space for the requirements of the mill, and the shipping facilities are excellent.

The recovery of fiber has been amply provided for. The white water is handled by several Adka Save-alls and Bird and Oliver filters which reduce the losses of fiber to a minimum.

With a program for increasing demands for power and water, extensive studies and explorations have been undertaken in the region of the volcanoes to find new water supplies and to increase the generation of power; also a new high pressure boiler with turbo-generator is being installed.

Progreso Industrial

During the war a substantial program of improvements and expansions was decided on for this mill. Because of the general shortage of material and equipment, it was about the middle of 1946 that the alterations were commenced. By February of this year, the most important improvements had been completed.

Two old German machines, 60-in. net trim, dating from 1899, with a daily capacity of 7 tons each, were removed. A Bagley-Sewall 110-in. machine has been erected. The machine is equipped with all the modern equipment such as hydraulic flow spreader, high pressure inlet, etc., and features a well closed white water system including a Sveen-Pederson save-all. The principal product will be book papers, but it is expected that the machine also will make grades like bonds, writings, bristols and coating body papers.

There is a 100-in. Puseyjones machine making from 20 to 25 tons daily of bonds, etc. Several minor improvements have been planned for this machine including a modern design inlet, improved white water system and a more efficient handling of the condensate from the dryers.

Another big improvement now completed deals with the preparation of the stock. Formerly, the stock was prepared in beaters and refiners. That system has been eliminated and the stock now is prepared in a 12-ft. Apmew pulper and various Jones pulpers with disintegrators, also various modern stock makers manufactured by the Morden Machine Company. The stock is handled by pumps and stored in tanks in such a way that each pulp is treated separately. The final furnish is made up by pumping the necessary amounts of hydrated and refined pulp from storage tanks to the mixing tanks and then to the paper machine. Indications are that there will be considerable saving in manpower and steam as well as more uniform and better preparation of the stock.

A substantial part of the output of the mill is coated on convention brush-type coaters. Plans are being considered with reference to improvements in the preparation of the coating mix as well as the installation of a new modern coating machine.

Further improvements are being carried out which include new high pressure steam boilers, steam turbine and a new water turbine to replace the present one.

FINANCIAL

▶▶▶ Paper mill securities, together with most industrials, dropped sharply during April on the country's principal stock exchanges. There is a feeling among investors, however, that the recession in the market has to a large extent discounted well in advance any immediate business recession. Meanwhile, however, the National City Bank has made a compilation of 1946 net income of 70 pulp and paper manufacturers showing that total earnings in that year were $140,163,000 as compared with earnings of $61,254,000 by the same mills in 1945. Analysis showed that the increase in profits was due principally to a greatly expanded volume of business, rather than to abnormally high profit margins. The elimination of the excess profits tax aided in raising the total net earning figure.

Champion Paper & Fibre Company—Net income for twelve weeks ended Feb. 2 was $1,340,546 as against $1,190,713 in the previous quarter.

Container Corporation of America—Net profit for the March quarter was $3,182,379 as compared with $1,032,787 a year ago.

Continental-Diamond Fibre Company—Net income in 1946 was $858,884 as against $435,877 in 1945.

Dixie Cup Company—Net profit for the fiscal year ended March 31 was $1,219,133 as against $1,213,845 for the previous year.

Eastern Corporation—Net income for the first quarter was $326,388 as against $207,850 in the same quarter of 1945.

Fort Wayne Corrugated Paper Company—First quarter earnings for 1947 was $720,534 as compared with $290,493 last year.

Robert Gair Company, Inc.—Net income for twelve months ended March 31 was $3,760,411.79.

Great Northern Paper Company—Net income in 1946 was $2,591,366 as against $902,710 in 1945.

Hammermill Paper Company—Net income in 1946 was $940,205 as against $528,038 in 1945.

Hawley Pulp and Paper Company—Net income in 1946 was $851,277 as against $134,134 in 1945.

Hollingsworth & Whitney Company—Net profit in 1946 was $1,493,047 as against $642,143 in 1945.

Kimberly-Clark Corporation—Net earnings in 1946 were $3,776,615 as against $1,985,691 in 1945.

PAPER · · · America's 6th Industry

DISPOSABLE PAPER DUSTING CLOTHS

(NEWS ITEM: *Disposable paper dust cloths are eliminating the dirt connected with soiled dust rags.*)

Mrs. America has discovered a new way to dust — disposable paper dust cloths impregnated with furniture oil. Soft and non-linting, this new dusting paper polishes while it cleans. A small amount of furniture oil impregnated in the paper picks up all of the dust and holds it. Preserves fine furniture and woodwork. Cheaper than cloth, this dusting paper is discarded when soiled.

We have secured a few samples of this new dusting paper from a leading manufacturer. If you desire a sample, let us know.

Paper iceboxes for shipping perishables . . . paper sacks for open storage . . . paper tape for recording sound . . . new uses for paper calling for new standards of lightness and toughness, new standards of quality in performance. New responsibilities — new opportunities for the Pulp and Paper Industry.

The Puseyjones Organization is now devoting itself completely to the design and construction of Paper-Making Machinery built to new high standards of speed and efficiency, and to the modernization of existing machines.

Among the new machines under construction by Puseyjones are three of the largest and fastest Fourdrinier Machines, one for white paper for bags, one for Kraft liner board, and one for Kraft paper for multi-wall bags; also one Cylinder machine of record size and speed for the manufacture of floor covering felt. Other machines are under construction for the manufacture of M. G. Kraft specialties, facial tissues, and high grade bristols.

During the next few months Puseyjones equipment will go into production in North Carolina, Massachusetts, Florida, Georgia, New York and California, as well as in Mexico and Sweden.

Puseyjones Engineers will welcome the opportunity to work with you in solving production problems.

THE PUSEY AND JONES CORPORATION
Established 1848. Builders of Paper-Making Machinery
Wilmington 99, Delaware, U. S. A.

THE SIGN OF TRADE MARK SUPERIOR QUALITY

Mead Corporation—Net income for three four-week periods ended March 23 was $1,139,440 as against $470,-302 for the similar period a year ago.

Nekoosa-Edwards Paper Company—Net income in 1946 was $1,023,130 as compared to $421,153 in 1945.

Paraffine Company, Inc.—Net income for the March quarter was $835,343 as against a net loss in the same quarter of 1945 of $614,311. Net for the nine months ended March 31 was $2,365,968 as against a loss of $539,508 for the same period a year before.

Rayonier, Inc.—Net profit for the March quarter was $1,789,186 as against $369,314 a year ago.

St. Regis Paper Company — Net profit for the March quarter was $3,-696,826 as compared with $1,004,656 a year ago. Directors will consider the resumption of common stock dividends in the third or fourth quarter of this year.

Riegel Paper Corporation — Net profit in 1946 was $1,105,000 as compared with $531,000 in 1945.

River Raisin Paper Company—Net profit in 1946 was $647,698 as against $164,924 in 1945.

Scott Paper Company—Net earnings for the March quarter were $572,272 as against $410,564 in the same quarter of 1945.

Sutherland Paper Company — Net profit in the March quarter was $610,-695 as against $302,397 in the same quarter of 1945.

Taggart Corporation—Net income in 1946 was $792,694 as against $495,578 in 1945.

Union Bag & Paper Corporation—Net profit for the first quarter was $2,671,941 as against $956,820 for the same quarter in 1945 and $1,611,-354 for the last quarter of 1945.

Paper Mill Corporate Changes

Container Corporation of America—Formal offering was made in April of 100,000 shares of 4 per cent preferred stock the proceeds to be used for an over-all expansion program.

Hawley Pulp and Paper Company—The owners of Claremont Paper Company, Claremont, New Hampshire, have purchased the Hawley Pulp and Paper Company. The new owners exercised their option to purchase on April 15.

United Paperboard Company — United Paperboard Company has purchased the Lowman Folding Box Corporation of Syracuse, New York, and will make it a wholly owned subsidiary, with M. E. Lowman, president of the old company remaining as general manager.

New York Stock Exchange—Stocks

	Closing Prices April 25	Mar. 25
A.P.W. Products	*4⅝-5	5½
Celotex	24	28⅝
Same Preferred	21	20⅜
Certain-teed Products.	14⅝	16⅜
Champion P & F Co..	21	22⅞
Same Preferred	*110-111	*109-110
Container Corp.	37½	41½
Cont. Diamond	10⅜	11¼-11½
Crown Zellerbach	26	28⅛
Same Preferred	104½	107
Same $4 Preferred..	110½	116
Dixie Vortex	28	31¼
Same "A"	52	53½
Robert Gair Co.	6⅜	6⅝
Same Preferred	20	*20¼-20½
Gaylord Container	15⅝	17½
Same Preferred	*90-100	*103-108
International Paper ..	40¼	46
Same Preferred	102¼	*103⅝-105
Kimberly-Clark	24⅛	24¾
Same Preferred	*106¼-106¾	108½
McAndrews & Forbes.	34	*36-37
Marathon	22	24½
Masonite	45¾	51½
Mead Corp.	19⅛	20½
Same Preferred	100	102½
Same 2nd Preferred.	49	*46½-48
National Container ..	35⅝	38⅛
Paraffine Cos.	68	70
Same Preferred	*107-110	*108½-112
Rayonier, Inc.	20	23
Same Preferred	36½	37¼
Scott Paper	*43-44¾	*42⅞-48
Same Preferred	*97½-99	99¾
Sutherland Paper	*39¼-40	43½
Union Bag & Paper..	29	29⅞
United Paperboard ..	15	16½
U. S. Gypsum	86⅞	102
Same Preferred	194-196	*192-197
United Wall Paper...	8½	8¾
Same Preferred	*45-46	*48-51
West Va. P & P Co.	37½	41¼
Same Preferred	*112-115	*112-113

New York Stock Exchange—Bonds

Celotex 3½%	....	104
Champion P & F Co..	103	....

New York Curb Exchange—Stocks

Am. Writing	8⅛	8½
Great Northern	40¼	42
St. Regis	9	9
Taggart	9	....

*Closing Bid and Asked Prices.

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BRITISH PAPER NOTES
(March, 1947)

▶▶▶ Reports from the many paper mills throughout England and Scotland are now being studied to determine the loss to the trade resulting from the recent coal crisis. On the whole, the effect has been severe although the Scottish mills have not suffered as heavily as did the English mills.

Unfortunately, the fortnight's duration of the crisis is not the full story, for several mills were closed owing to a shortage of coal prior to the crisis. A number of mills have ceased production entirely for two to four weeks; a few have been able to maintain production by one method or another. Between these two extremes there has been a general tone of scarcity. At least one instance is reported of a mill having sufficient coal for its immediate needs and this stock being taken over by the government in order to keep a local electric plant working.

If we turn from the past and look at the future, the outlook is not reassuring, for it is reported that the coal allocation to the paper trade under the Cripps Plan (which is in force until the end of April) is only 33⅓ per cent of normal. Consequently, many mills may be able to run only one week out of three. What will happen after May is problematical. Happily, however, reports of greater production of coal may eventually ease the situation. Unhappily, coal is not the whole story—it now develops there is a serious shortage of chemicals.

Announcements have been made by the National Association of Paper Merchants and the Envelope Makers and Manufacturing Stationers Association warning the public that both paper and business and private stationery will be scarce during the current license period, which terminates the end of June.

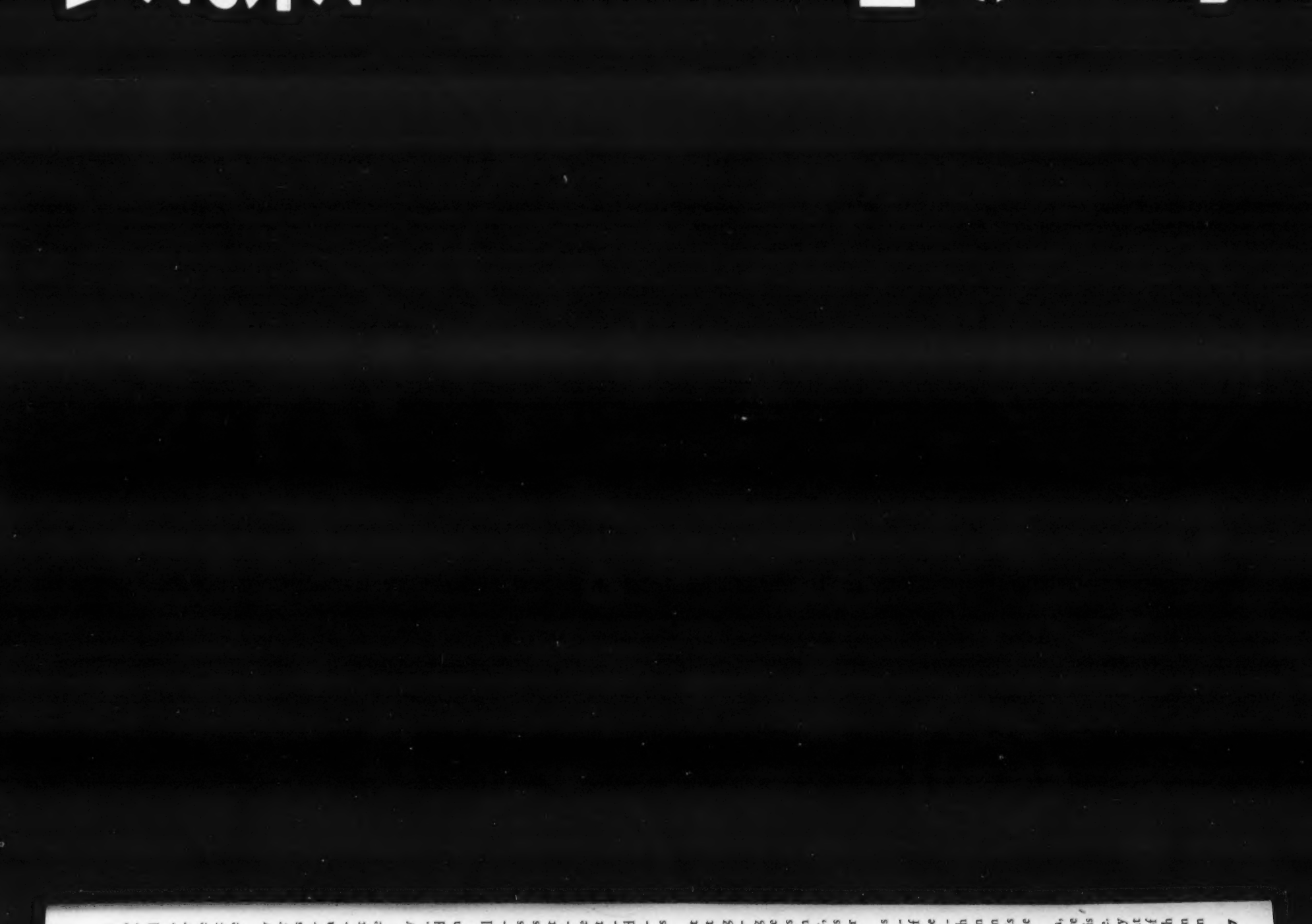
Beyond this present period, nobody is desirous of making any predictions. The general position is uncertain, and industry has so few facts upon which it can base its future activities.

Meanwhile, although the national newspapers have been allowed to return to a size slightly larger than was used prior to the crisis, trade journals and other periodicals are remaining at the wartime size. Even with this reimposed restriction, publishers are warned by the Paper Controller that they may experience difficulty in obtaining supplies, and they are advised to make every effort to limit consumption and to conserve their resources during the ensuing weeks.

In addition, it now transpires that Sir Stafford Cripps has admitted that the stoppage of the trade press during the coal crisis was a mistake. An instance of the resultant small saving is contained in the report from one printer responsible for two newspapers and twenty journals. By closing down the twenty journals for a fortnight, the actual saving in electricity was less than $160; or $4.00 per journal per week.

As an example of the difficulties facing the British papermaker at present, we recently were shown a run of green duplicator which included three distinct shades of green. The explanation given was that the run, which started at midweek was shut down over the week end and re-started on Monday. After starting up, it was necessary to stop again because of the lack of coal.

In contrast to the present position, it is a happy prospect for the future that the trade, caught unawares, is seeking every possible avenue of escape. The trade associations are particularly active. Among the interesting recent meetings that of the Association of Makers of Coated Papers, of which L.C.S. Lewsey has held the position of chairman for the past fourteen



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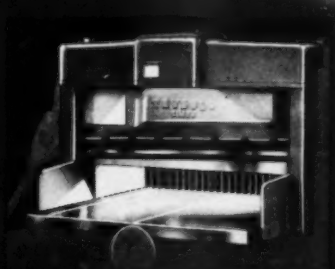
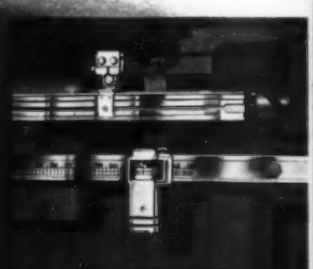
...st and thorough lubrication "once over" is easy with the new Seybold "Sixty" Trimmers and Spacers. Here's why. All lubrication points are out in the open . . . more convenient to find . . . less likely to be overlooked. Modern Zerk fittings speed up the job . . . assure cleaner, more permanent lubrication.*

You save time during each lubrication —and stretch out the periods between lubrications as well.

Other Seybold "Sixty" features, shown below, speed up trimming operations and increase production even more. If you are not getting this kind of trimmer performance, why not talk it over today with your Harris-Seybold representative?

**One more reason why we say "with a Seybold 'Sixty', maintenance is practically nonexistent."*





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ARRIS PRESSES • SEYBOLD MILL TRIMMERS AND AUTO-SPACERS • OTHER GRAPHIC ARTS EQUIPMENT

Backed up by the world's largest and most highly-skilled, factory-trained paper cutter service organization.

years. The remarkable activity of this section is shown by production and exports for the years 1939 and 1946. Whereas during the former year 103,000 tons were produced and 6,661 tons exported, during 1946 only 70,000 tons were produced but about 10,000 exported. The coated section was one of the first sections of the British Paper Trade to create some form of stability in the uncertain years prior to the war. The first move in this direction was effected by bringing all the members to an agreement not to lower prices; qualities were graded and fixed selling prices arranged. Incidentally, it was disclosed during the meeting that, touching upon increased prices of raw materials, casein had jumped from its prewar cost of £19 per ton to the present price of £225 per ton.

Rather belatedly, the board of trade returns have just been published covering the first month of the year. These, however, do not reflect the effect of the coal crisis; the April figures will disclose these. During January, imports of papermaking materials were higher than in December, as also were exports of paper, but imports of paper were down slightly. Chemical wood pulp and esparto grass provide the extra materials imported, the latter reaching nearly 21,000 tons.

◆

OUTBREAK OF DEADLY INSECT PEST LEAVES TRAIL OF DYING PINES

The southern pine beetle, an insect pest that can ruin a pine tree in about three weeks, is again attacking forests in the eastern and southern states. For years it has been one of the worst enemies of southern pines, particularly in dry seasons, according to the Bureau of Entomology and Plant Quarantine, United States Department of Agriculture. Owners of pine timberland throughout the South and East are urged to watch their trees closely this spring and summer for groups of pines with fading foliage, an indication that the trees are infested with this insect.

Outbreaks of the beetle are reported from North Carolina, Tennessee, Alabama, and Florida, where in some sections deficiency of rainfall during the past two years has weakened the trees, and made them susceptible to attack. Losses so far range from a few trees to holdings of 80 acres. In 1946 over a million board feet of commercial pine lumber was lost in a single locality in Tennessee. A severe attack in 1930 and 1933, cost one lumber company five million board feet of commercial timber. Another company lost six million board feet during an outbreak in 1936 to 1938.

The Bureau of Entomology and Plant Quarantine is keeping a close watch on this outbreak and requests that reports on presence of the pest be sent to the Agricultural Research Center, Entomology Building C, Beltsville, Maryland.

◆

EXPANSION IS PLANNED BY HOWARD SMITH PAPER MILLS

An expansion program involving an expenditure of several million dollars is being planned by the Howard Smith Paper Mills of Cornwall, Ontario. Construction is already under way.

The company also announces that the laminated plastic division, operating in an experimental capacity at Cornwall will be moved to a location near Montreal within a year.

◆

SUTHERLAND PAPER COMPANY PASSES 30TH ANNIVERSARY

April 17 was a red letter day for the Sutherland Paper Company, Kalamazoo, Michigan, for it was just thirty years ago on that date that the company started operations.

The company was first known as the Kalamazoo Sanitary Carton Company, and it made only butter cartons. The founders were: L. W. Sutherland, now chairman of the board; his brother the late Fred Sutherland, and Oscar Gumbinsky. Later the name was changed and in 1921 the company built its own board mill. In 1928, it acquired the Standard Paper Company. A construction program now under way will run over $1,500,000.

◆

TWELVE-MILLION DOLLAR SULPHATE PULP MILL TO BE BUILT IN GEORGIA

Plans are rapidly taking shape for a sulphate pulp mill which the Magnolia Timber and Development Corporation, of Louisiana, proposes to build at Bainbridge, Georgia. This project has the support of the Senior and Junior Chambers of Commerce, of Decatur County, which two bodies have been assisting the corporation in securing leases on about 300,000 acres of timberland. Plans for building the mill were dependent largely upon securing an adequate timber supply, and contracts with timber owners now seem to insure building of the mill.

It is estimated the plant will cost $12,000,000. Ultimately, it is expected a paper mill will be constructed, but first plans call only for a pulp mill.

The site is the old Bainbridge Army Air Base which is bejng leased to the Magnolia corporation by Decatur County. The present site was selected because of (1) the heavy growth of a fine quality of pine timber; (2) ideal transportation facilities—the city is served by two railroads and several highways—and (3) because of the projected development of the Chattahoochee River.

Under the terms of the contract offered by the corporation to timberland owners, the latter agree to sell the company all their interests in pulpwood growing on the property leased over a period of forty years.

The corporation plans also to foster modern scientific timber farming and harvesting operations.

◆

BROMPTONVILLE MILL AGAIN WILL TURN OUT NEWSPRINT

A recent statement from Brompton Pulp & Paper Co., Ltd., announces that the manufacture of newsprint will be resumed at its mill in Bromptonville, Quebec, probably by midsummer.

The company is assembling 160-inch newsprint machine which was partially dismantled at the East Angu mill in 1931. Only recently the com pany succeeded in obtaining equipment to put this machine into operation.

◆

EXTENSION TO THE HOLYOKE FLOODWALL TO BE BUILT

A two-million-dollar extension to the Holyoke (Mass.) floodwall is to be constructed this spring. This extension will be built along a stretch of water-front for the purpose of protecting several paper mills from damage during floods in the Connecticut River.

The construction contract specifies the number of days that each paper mill raceway will be shut off while work is in progress and the contractor will be under penalty to observe this schedule. The paper mill companies were required to give easements to the Government for access to their property for construction and maintenance purposes. The work is to be done under supervision of the War Department Corps of Engineers.

The following representatives of paper manufacturers attended an engineering conference in Holyoke at which contract details were formulated and agreed upon: Joseph E. Holmes and E. C. Tucker, Chemical Paper Manufacturing Company; Fernand H. Willemain, Charles L. Kirkpatrick, and George E. Scully, American Writing Paper Corporation; Robert M. Swaney, Franklin Paper Company; and James N. Logan, Newton Paper Company.

YES, the use of BECCO HYDROGEN PEROXIDE has increased in the Paper and Pulp Industry

INDICATIVE of the increase in the use of Becco Hydrogen Peroxide, is the fact that we have increased the number of our tank cars by more than 1300 per cent from 1931 to 1947!

What is the reason for this steady, substantial growth in the use of Becco Hydrogen Peroxide? This steady increase is not because of only *one* reason, but several. First, as a result of continuous research, Becco Hydrogen Peroxide has been improved to meet the specific requirements of industry. Second, Becco Hydrogen Peroxide is very easy to handle. Shipped in drums or tank cars, it is easily, quickly and automatically fed to the point of use. Third, Becco research has, in part, been devoted to improving groundwood pulp and paper bleaching.

As a result of many years of this research, Becco's engineers and chemists are qualified to give valuable advice and data on groundwood pulp bleaching. Why not ask them how you can improve the brightness of your finished product? There is no obligation; just write to:

BECCO SALES CORPORATION

AGENTS FOR BUFFALO ELECTRO-CHEMICAL COMPANY, INC.

BUFFALO 7, NEW YORK

New York Boston Philadelphia Chicago Charlotte

Wood Pulp Industry in Alaska Favored by Pulp Consumers

▶▶▶ A MARKET WOOD PULP industry development in Alaska has been approved by the Association of Pulp Consumers, Inc.

The limited amount of wood pulp estimated to be available this year from European producers again focuses attention on the necessity for increasing the production of market wood pulp in this country.

The Tongass National Forest in southeastern Alaska contains hemlock and spruce timber sufficient to supply 800,000 tons of sulphate and/or sulphite wood pulp annually. Ample waterpower and suitable pulp mill sites are found in tidewater regions of Alaska less than a thousand miles from Seattle. Heretofore, Indian tribal claims have retarded industrial development of the forests in Alaska. These claims are due to be settled soon and the way will be clear for the Government to enter into long-term contracts for timber, pulp mill sites, and water power development.

In its endorsement of a market wood pulp development in Alaska, the Association of Pulp Consumers outlined the current wood pulp situation to the Secretary of Agriculture under whose direction the forests are administered, and the Secretary of the Interior who supervises the development of the territorial policy. It was pointed out that less than half (44.6 per cent) of the 2,535,797 short tons of market wood pulp consumed during 1946 in the production of paper and paperboard was produced in the United States, 25.9 per cent was imported from Canada, 25.9 per cent from Sweden, and 3.6 per cent from Finland. The number of domestic firms producing wood pulp exclusively for sale has been decreasing, and presently there are but seven of which one sells nearly all of its production to the rayon industry.

Recent studies indicate that the limit of the amount of market wood pulp the consumers can expect from Canada has been about reached, and that imports from Europe will be less than the amount needed to provide the balance of their requirements. As a result of the situation in this country and abroad, it appears that the United States paper and paperboard mills depending on market wood pulp have very little opportunity to maintain their position and share in the expansion of the industry unless more market wood pulp is made available.

PUTNEY MILL IS REBUILT— NEW BUILDING WILL HOUSE GREEN VIEW TISSUE MILLS

The mill of the Putney Paper Company, Inc., Putney, Vermont, destroyed by fire June 18, 1946, has been rebuilt and is now back in production with one 72-inch machine producing eight tons of semicrepe napkin and toilet tissue stock every 24 hours.

A 92-inch machine is to be installed in August which will bring the mill's capacity up to 18 tons per 24 hours.

According to a statement by Wojciech Kazmierczak, president, treasurer, and principal owner of the mill, fire insurance covered the actual fire loss, and interruption insurance paid the wages of his 17 men during their lay-off since the fire. Meanwhile, the male employees helped the builder of the new mill.

Many improvements have been incorporated in the plant and there are considerably fewer fire hazards. The plant is entirely rebuilt except for the boiler room which was damaged but not destroyed.

The converter plant of the Green View Tissue Mills which had occupied space in the Putney Company's building and was also made homeless by the fire, soon will be housed in a new building in Putney Station. When the structure is completed early in the summer, the company will operate six machines for embossing, folding and packaging.

Wojciech Kazmierczak (known locally as John Smith) was formerly superintendent of the Robertson Company, Ashuelot, New Hampshire. He came to this country from Poland in 1913.

◆

THREE EASTERN PAPER INDUSTRIALISTS BUY CONTROL OF HAWLEY CO.

A recent announcement stated that the Hawley Pulp & Paper Company, Oregon City, Oregon, had notified its stockholders that an undisclosed buyer had an option to purchase a substantial majority of the common stock of the company (Cf. P.I. and P.W. April, 1947).

J. R. Smith, Hawley president, now announces that three eastern paper industrialists have taken up a $300,000 option on 65 per cent of the common shares prior to purchasing additional stocks and control of the firm. Mr. Smith also stated that the option involved acquisition of additional shares which would boost the holdings of the buyers to 85 per cent.

The announcement reveals that the control will go to John E. Wilson, Scarsdale, New York; R. B. Gerard, Kent, Connecticut; and James H. Molloy, Philadelphia, former owners of the Claremont (N. H.) Paper Corporation.

The Hawley plant and assets are valued at $5,500,000. The firm produced 82,412 tons of paper in 1946 with net sales of $7,145,707.

◆

INDUSTRY MAKING PROGRESS TOWARD STREAM POLLUTION ABATEMENT IN THE SOUTH

The South's rapidly expanding pulp and paper industry is making progress in its program of stream pollution abatement, representatives of Southern state regulatory bodies were told at a meeting in Edgewater Park, Mississippi, on April 17.

The Southern Division of the National Council for Stream Improvement, established four years ago by the pulp, paper and paperboard industries to study ways of reducing pollution, reported that a research project set up at Louisiana State University already had developed data of a basic nature which would help solve the problem.

William A. Moggio, research associate at the University's engineering experiment station, said his studies deal with development of practical means of utilizing oxidation methods which had been demonstrated as capable of purifying kraft pulp mill wastes under certain conditions.

Noting that the LSU studies were started in November, 1946, Mr. Moggio explained the first phase of the project was being directed toward determining the rate of oxidation by biological means of washings from pulp operations. The Gaylord Container Corporation, at Bogalusa, Louisiana, is assisting in these experiments.

Mr. Moggio said the second phase of the project will be directed toward developing a practical process for treating kraft mill waste through laboratory, pilot and full-scale plant research.

Meeting with the council were representatives of the Florida State Board of Health, Georgia Department of Public Health, Louisiana Division of Public Health Engineering, Louisiana Stream Control Commission, Mississippi Game and Fish Commission, Mississippi State Board of Health, and Alabama State Health Department.

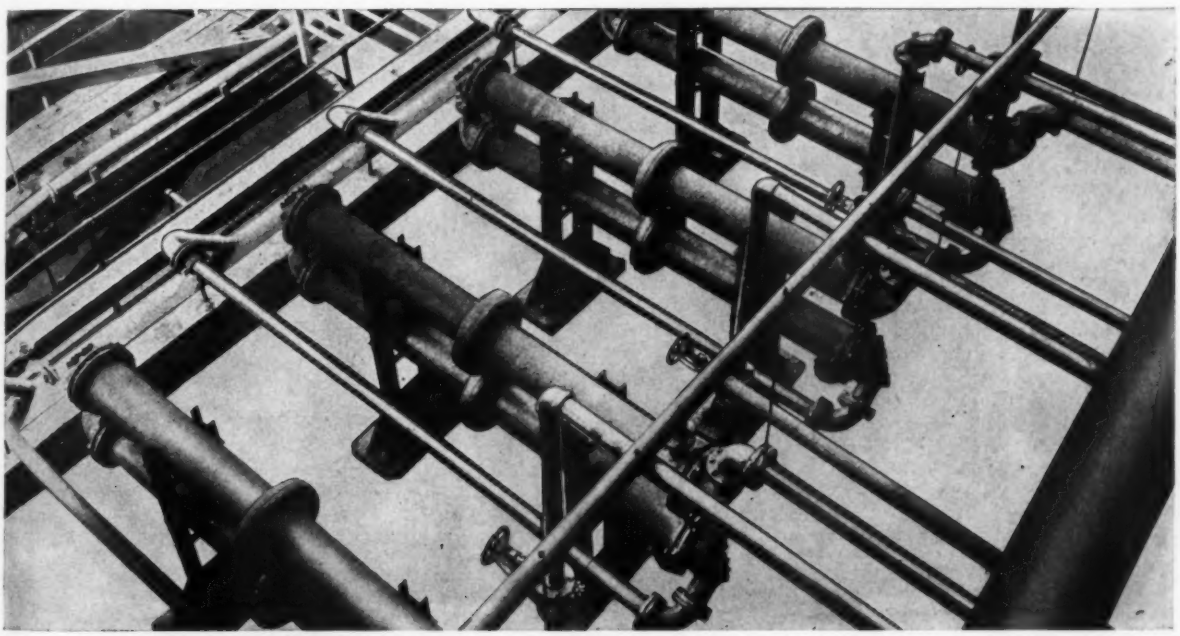
ESCO STAINLESS SO_2 GAS COOLERS for more efficient cooling...

HOT WEATHER need not mean excessive acid loss. Every year many of America's pulp mills overcome this problem by using *ESCO* stainless steel SO_2 gas coolers.

These coolers are being used in increasing numbers because of the following advantages:

- *Minimum space required*—less than other coolers of the same capacity.
- *Easy, flexible installation.* 100 sq. ft. units can be added or removed easily as varying conditions require. May be installed in parallel or in series.
- *Eliminates expansion packings* by using bellows type expansion joints. Stress relieved.
- *Resists corrosion.* All parts in contact with gas or acid are made of *ESCO* Alloy 45 or Type 316 Stainless Steel.

ESCO stainless SO_2 gas coolers can be delivered on short notice—before hot weather begins. Order from your nearest *ESCO* representative, or write us direct.



ESCO STAINLESS STEEL FOR ULTIMATE ECONOMY

ELECTRIC STEEL FOUNDRY

2151 N. W. 25th AVENUE • PORTLAND 10, OREGON

OFFICES

CHICAGO, ILLINOIS
EUGENE, OREGON
HONOLULU, T. H.
LOS ANGELES, CALIF.
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SEATTLE, WASH.
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IN CANADA — *ESCO* LIMITED, VANCOUVER, B. C.

MAIL COUPON FOR CORROSION CHART

ELECTRIC STEEL FOUNDRY
2151 N. W. 25th Avenue, Portland 10, Oregon
Please send study of corrosion resistance to:

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Washington

SENATOR NAMES FOUR WAYS TO AUGMENT THE SUPPLY OF NEWSPRINT

A prolonged series of hearings at Washington, as investigations of the problems of paper supply and demand, has resulted in various statements by paper industry leaders defending the industry against the complaints of consumers of short supply.

A specific outcome was a bill introduced by Senator Capehart, chairman of a Senate small business committee, to meet the newsprint situation by authorizing the formation of a committee of consumers and producers to function as a voluntary group to facilitate the adequate distribution of newsprint to large and small users alike.

Senator Capehart said there were four ways in which newsprint supply could be augmented as follows: (1) a better distribution of presently available supplies; (2) development of new mills in Alaska, which will take three to four years to come into production; (3) to anticipate increased capacity in Canada, and (4) to hope from increased shipments from Europe.

TINKER REPRESENTS THE INDUSTRY AT HEARING ON STREAM POLLUTION

E. W. Tinker, executive secretary of the American Paper and Pulp Association, made a strong statement on the attitude of the paper industry toward stream pollution at a hearing before the Senate subcommittee which has under consideration a bill to solve this problem.

Mr. Tinker said that the attitude of the industry was essentially that of the proposed bill, an effort to solve the problem on a practical basis which will result in a diminution of the evil, without disastrous results to industry. He pointed out that the industry has for years been carrying on a constructive campaign to reach the ends which he believes the Senate bill sought to achieve.

IMPORT NOTES

Imports of foreign paper dropped slightly during February, according to a report issued by the Import Committee of the American Paper Industry, but part of the decrease was due to the short month. Imports from Scandinavia also were somewhat smaller due to the ice conditions in the Baltic. Despite this situation, however, imports of kraft from Sandinavia totaled 650 tons, and sulphite wrapping 500 tons.

Custom officials have decided that gypsum wallboard imported from Canada, claimed to be dutiable as laminated paperboard at $14.50 per ton, is dutiable as in chief value of gypsum at 35 per cent. Paper described as "antique catalogue," was classified as dutiable printing paper and not allowed duty free entry as standard newsprint. Paperboard claimed by an importer to be dutiable as laminated paperboard at 30 per cent, believed by Customs officials to be dutiable as pasted bristol at 3 cents per pound and 15 per cent.

A shipment of metal coated paper believed by Customs officials to be under-valued, but claimed by importer to be dutiable at the controlled export market price set by foreign manufacturers, has come before the United States Customs Court for trial.

EYES ON GENEVA

The eyes of American industry are turned toward Geneva where international negotiations for the reductions of duties are under way. The paper industry has made a strong showing in open hearings and briefs of the need for maintenance of present tariff rates, but is fearful of the outcome of the negotiations abroad.

Such secrecy is being maintained at Geneva on the progress of negotiations that newspaper correspondents, finding the news black-out utterly complete have left Geneva for their normal posts. They say that there will apparently be no indications of the trend of negotiations until some disaffected powers complain that they are not being given the treatment they ask.

One thing appears to be certain: The entire demand for tariff reductions comes from the United States, which hopes to pressure other powers into duty rate cuts by offers of extensive cuts in American rates. The United States has insisted on multilateral negotiations while the British Empire has stood for bilateral agreements. Compromise has been reached by a program under which more than 100 separate negotiating teams will do their horse-trading on a bilateral basis, and then the whole program be combined in one multilateral agreement.

The paper industry is principally concerned because there is no outstanding authority on paper in the entire American delegation. Practically no member of that delegation has ever had any practical experience in paper manufacturing or sales, or even in governmental agencies dealing with paper.

UNITED PAPERBOARD BUYS LOWMAN FOLDING BOX CO.

The entire interest of the Lowman Folding Box Corporation, Syracuse, New York, has been purchased by United Paperboard Company, New York City. The Lowman corporation becomes a wholly owned subsidiary of United Paperboard Company, and Mella E. Lowman, one of the owners, remains with the new interests as general manager.

The Lowman plant comprises several buildings. The concern has been doing a yearly business of about $1,500,000; it has 160 employees.

◆

RADIANT HEATING PLANT IS INSTALLED AT FERNANDINA

A new design for radiant heating application in industrial plants—aimed to reduce both installation charges and maintenance costs—has been developed by The Rust Engineering Company for the Fernandina (Fla.) mill of Container Corporation of America.

High temperature water instead of steam is utilized as the heat source by the new system. It eliminates thermostatic traps, condensate pumps and pressure reducing stations, all of which are factors both in original cost and in the maintenance expense of orthodox, steam radiant heating.

This installation is believed to represent the first industrial use of high-temperature water to transfer heat to radiant coils.

◆

SEVEN PAPER COMPANIES BUY SPAULDING PULP & PAPER CO.

Purchase of a controlling interest in the Spalding Pulp & Paper Company, Newberg, Oregon, by a syndicate representing seven eastern and midwestern paper companies, was announced April 1 by J. C. Compton, Spaulding president. The seven companies are:

Perkins-Goodwin Company, New York City

Watervliet Paper Company, Watervliet, Michigan

Morris Paper Mills, Morris, Illinois

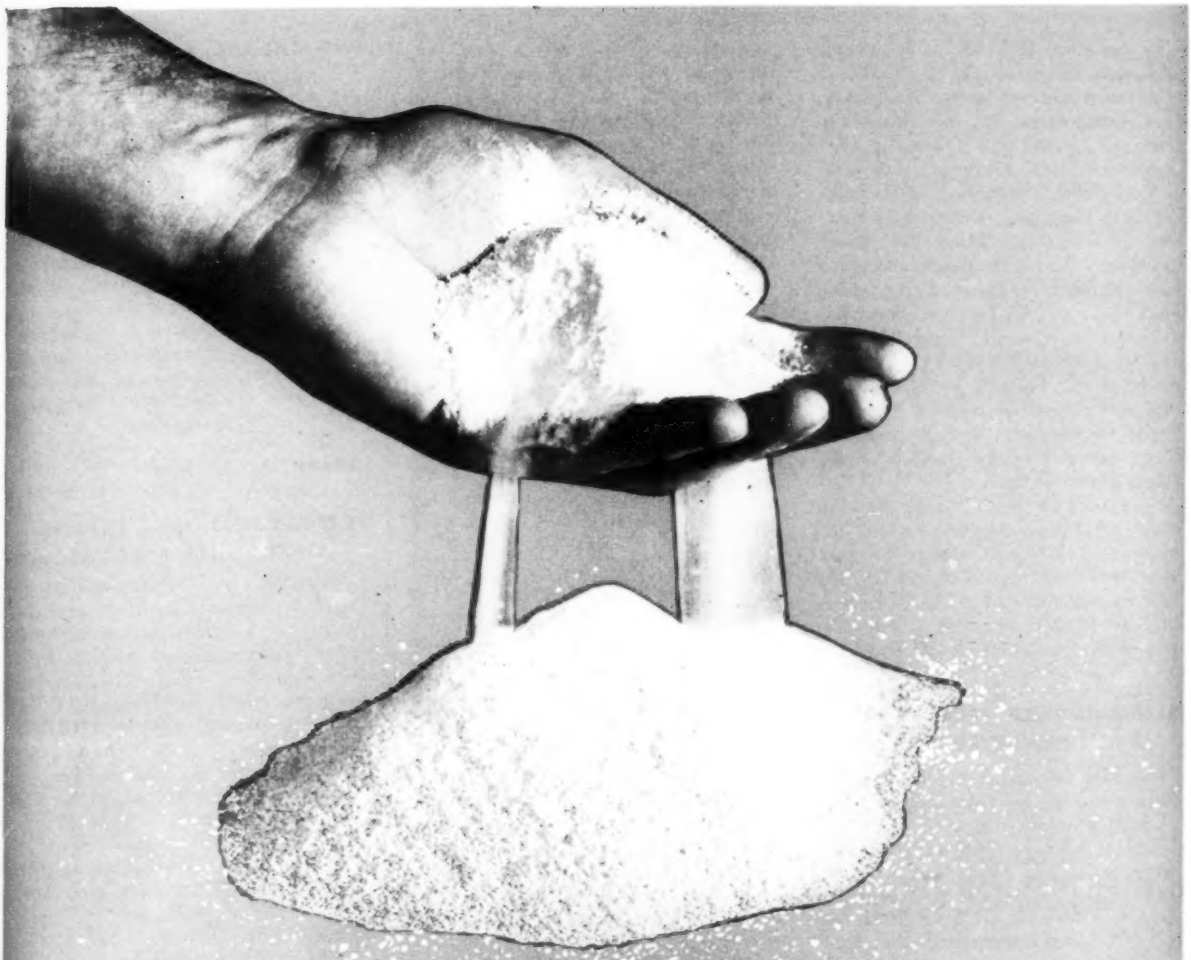
Hummel & Downing Company, Milwaukee, Wisconsin

Cornell Wood Products Company, Cornell, Wisconsin (main office, Chicago)

Riverside Paper Corporation, Appleton, Wisconsin

St. Regis Paper Company, New York City

Paul Scallan, of the Perkins-Goodwin Company and sole representative for the negotiations, said the seven firms had acquired 9,460 of 12,000 to 13,000 shares of Spaulding com-



Have you tested

Hercules* CMC?

(SODIUM CARBOXYMETHYLCELLULOSE)

REPORTS from paper and board mills indicate that this new addition to the Hercules line of fine papermaking chemicals offers important properties that may be valuable to *you*. Applied from the size press or calender water box, Hercules CMC improves the surface and strength properties of paper. Of particular interest, it increases resistance to penetration of gloss inks, waxes, and oils. Added at the beater, it improves the strength properties of paper. Write for test sample.

HERCULES

SIZING MATERIALS AND CHEMICALS FOR PAPER

HERCULES POWDER COMPANY
961 King Street, Wilmington 99, Delaware

*Reg. U. S. Pat. Off. by Hercules Powder Company.

P7-4

pany common stock, and it is seeking to acquire all of it at $100 a share.

At an adjourned session on March 31, stockholders in the Spaulding company elected the following new directors: J. C. Compton, president of Spaulding; Paul Scallan, of Perkins-Goodwin Company; George E. Ferguson, president of Watervliet Paper Company; W. H. Beckwith, executive vice president of Morris Paper Mills, Morris, Illinois; W. Irving Osborn, Jr., president of Cornell Wood Products and of Hummel & Downing Company; E. C. Hilfert, secretary-treasurer and general manager of Riverside Paper Corporation; and Reginald L. Vayo, assistant to the president of St. Regis Paper Company.

The announcement states that the entire Spaulding organization will remain as before and that ultimately expansion and modernization of the mill is contemplated. The plant was built in 1925 at a cost of $1,000,000. It produces unbleached sulphite pulp.

◆

STERLING PULP PROCESS ACQUIRED BY BUFFUM & CO.

Exclusive franchise for the Sterling pulp process for manufacturing reclaimed wastepaper into newsprint has been acquired by Buffum and Company, Chicago, from the American Industrial Company of Buffalo. This franchise covers the United States and all foreign countries.

Buffum and Company are the mill agents and owner operators of both the Sheffield Paper Mills, Inc., Saugerties, New York, and Girard Paper Mills, Inc., Girard, Pennsylvania. The Sheffield company acquired the Diamond mills, formerly owned by the Fabricon Products, Inc., New York, in December, 1946, and the Girard Paper Mills, Inc., acquired the Conestoga Paper Mill, Girard, on January 1 of this year.

Buffum and Company state that details of its plan to produce newsprint manufactured by the Sterling process will be given out later.

◆

TASMANIA MILL INSTALLS THIRD MACHINE—ORDERS FOURTH FOR 1950 DELIVERY

From the Associated Pulp and Paper Mills, Ltd., Burnie, Tasmania, comes word that the company is installing a third 120-inch paper machine. Additions also are being made to the pulp mill. A fourth machine, a counterpart of No. 3, is on order for delivery in 1950. No. 1 and and No. 2 machines trim 200 inches and 90 inches respectively.

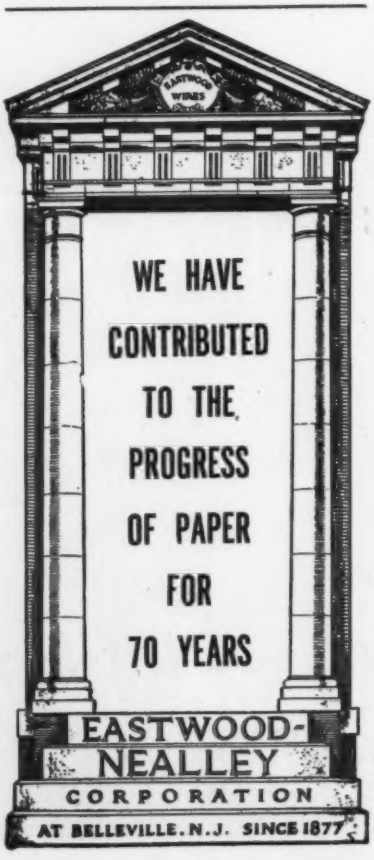
Work is progressing on a large company-owned sawmill which will expedite the utilization of timber from the company's freehold and adjacent forests. A progressive forest policy also has been adopted which will provide adequate timber supplies for its operations in perpetuity with a cutting cycle which will vary from forty to sixty years.

◆

HIGH-FREQUENCY DRYING METHODS ARE FAVORED BY NORWEGIAN PAPER EXEC.

The use of high-frequency drying methods for paper, pulp and textiles in Canada was termed as "the most revolutionary industrial process of the century" by Arthur Ronden, shipping, pulp and paper magnate of Oslo, Norway, while visiting in Vancouver recently.

The saving of labor and time as compared with former methods is almost unbelievable, Mr. Ronden said, especially in Norway where electricity costs only one-fifth of a cent per kilowatt-hour. He expressed an opinion that 50 per cent efficiency will be obtained from electric power in the wood pulp industry with the use of high frequency. The present rate of efficiency, using the power for steam generation is only 14 per cent.



IMPORTATIONS OF FRENCH NEWSPRINT ARE RUMORED

Apparently well-authenticated reports in New York are that there will be a large tonnage of French newsprint imported before the end of the year and that 2,000 tons are already under way to be sold at $235 per ton, New York. The agencies handling this tonnage claim to have 40,000 tons available before next year.

The paper comes, it is said, from a well-known French mill, and it would seem that France is more willing to take this huge profit by selling in the United States than to maintain French newspapers on a normal circulation and size basis.

◆

BATTELLE INST. WILL EXPAND ELECTRONICS LABORATORIES

Industrial and governmental demand for research in electronics has resulted in an expansion of the electronics laboratories of Battelle Institute, Columbus, Ohio. The expansion program, which has been under way for the past year, involves the allocation of more space to Battelle's electronic laboratories, the purchase of extensive equipment, the addition of new personnel, and the centralization of facilities for electronic research.

Because there is an increased consciousness of electronic controls in industry, the Institute has had an increasing number of requests from industries for assistance in control and instrumentation problems. These industries include papermaking.

Electronic research at Battelle is under the direction of Dr. H. W. Russell and under the immediate supervision of Dr. H. R. Nelson and Dr. F. C. Todd.

◆

BEGIN WORK AT HOLT ON GULF STATES EXPANSION

Two additional buildings have been planned and excavation completed for the expansion of the Gulf States Paper Corporation plant near Holt, Alabama. The additions will house a new paper machine, beaters, screens, digesters and other equipment which will increase the tonnage capacity to between 300 to 350 tons of kraft paper per day.

A modern locker room building for employees also will be constructed at an early date.

◆

▶▶▶ A LEASE HAS BEEN given to the California Container Corporation on the mill in Vernon (Los Angeles County), California, formerly owned by Columbia River Paper Mills Company. The lessee is a subsidiary of Container Corporation of America.

BRIEFS

▶▶▶ THE MODERNIZATION program of the Parsons Paper Company, Holyoke, Massachusetts, calls for a $100,000 two-story building for the housing of processing equipment at first—eventually it will be used as a machine room. The new addition will rise above the older, adjacent buildings and will be constructed of brick, steel, and glass brick.

◆

▶▶▶ TWO VISITORS from Sweden, representing some 30 companies in that country — Ulf Danielson, of Filipsted, and Sven Eckman, woods manager of the Udderholm Company, Udderholm—are touring the principal pulp producing and woods operation areas in the United States.

◆

▶▶▶ THE OPENING OF a multiwall paper bag sales office in Louisville, Kentucky, has been announced by the St. Regis Sales Corporation (New York). The location is at 318 Martin Brown Building, and the office is under the supervision of Charles C. Keefer.

◆

▶▶▶ A REDUCTION IN PRICES of kraft boards has been announced by John H. Hinman, president of International Paper Company. Kraft liner board is reduced $5.00 per ton, and the price of kraft corrugated containers is down $10.00 per ton. Following this announcement, Mr. Hinman received a strong letter of commendation from Dr. John R. Steelman, special assistant to President Truman.

◆

▶▶▶ THE HINDE & DAUCH Paper Company of Sandusky, Ohio, has purchased a 22-acre site at Thatham, Ontario, for construction of a $1,000,000 box factory. The new plant will be owned and operated by the Hinde & Dauch Paper Company of Canada, a subsidiary.

◆

▶▶▶ WITH AN EXPRESSION of confidence that the pulp and paper industries will be able to meet future requirements, the Dixie Cup Company is proceeding with a construction program that will provide a major outlet for paper. The company's plant at Easton recently has been enlarged about 25 per cent by the addition of a new modern wing. It is expected this addition will increase the productive capacity of the factory by 25 per cent.

SODIUM SULPHATE

SODIUM CARBONATE

For Immediate Sale

In natural surface lake deposits located in Wyoming, just off Highway 287, midway between Casper and Rawlins; has never been accurately surveyed; high spot estimates indicate at least 500,000 tons of sulphate and 28,000 tons of carbonate waiting for development; any reasonable offer, preferably on royalty basis, will be considered; inquiries for further detail invited.

NATRONA ALKALI COMPANY

Room 9026 Du Pont Building

Wilmington (98), Delaware

• Please note the change in the corporation name. The management believes that the new name NOPCO CHEMICAL CO., is more truly descriptive of the increasingly broader scope of the company's activities in chemical manufacturing.

COATED PAPER MILLS REPORT...

Important Benefits from use of Nopco* ESI

New Aqueous Dispersion of an Insoluble Metallic Soap

DATA BASED ON RECENT SPOT CHECK ANALYSIS OF MILLS USING NOPCO ESI IN VARIOUS PARTS OF THE COUNTRY.

Other Known Advantages

Applicable in either conventional coating or paper machine coating process.

May be used in either *casein* or *starch* coatings.

Readily diluted in water to any desired concentration . . . gives a dispersion stable to both mild acids or alkalis.

Thoroughly plasticizes pigment particles even after coating has dried . . . important for eliminating a troublesome dusting problem.

*Reg. U. S. Pat. Off.

FIRST MILL... *4 benefits reported* . . . (1) improved brightness and gloss on paper machine operations; (2) improved flow characteristics; (3) uniformly smoother coating; (4) reduction of dusting problems at calender stack.

SECOND MILL... *4 benefits reported* . . . (1) improved brightness and gloss on clay coating compositions; (2) better flow characteristics; (3) final coating of improved smoothness; (4) elimination of dusting problems at the supercalenders.

Other users report that Nopco ESI also aids in controlling foam in coating formulations.

11 MILLS... reported "ordering regularly" . . . over 50% of the mills contacted during survey.

If you—in common with many other mills—have difficulty in obtaining uniformly satisfactory performance from clay coatings—write for complete particulars on NOPCO ESI.

Nopco Chemical Company, Harrison, N. J.

Formerly National Oil Products Co.

Branches: BOSTON • CHICAGO • CEDARTOWN, GA. • RICHMOND, CALIF.

An Affiliate of the American Pulp and Paper Mill Superintendents Association

Aqueous Dispersion of an Insoluble Metallic Soap

NOPCO ESI

NOPCO EVOLVED THROUGH RESEARCH

The vapor that rises from the driers of a paper or board machine represents coal consumed under the boilers. Every extra pound of water squeezed out of the sheets at the press means a pound less to be evaporated . . . less coal to be burned . . . less dollars to go out the ventilators.

The amount of water that can be removed at the press is determined largely by the *appropriateness of the felts* for the job to be done. The wools used in their manufacture must be properly selected and blended . . . size and shape of mesh must be right . . . weaving, shrinking, fulling and finishing must be the work of skilled craftsmen with long experience in their art.

This explains why low cost production attends the use of *correctly selected* Hamilton Felts. Almost a century of experience goes into their manufacture. More than 300 different felts are in the Hamilton line. Each one represents maximum efficiency for the purpose for which it is designed.

• From the thinnest tissue to the heaviest board there is a Hamilton Felt that will do your work better, faster and at lower cost.

SHULER & BENNINGHOFEN, HAMILTON, OHIO

• Miami Woolen Mills •

Hamilton Felts

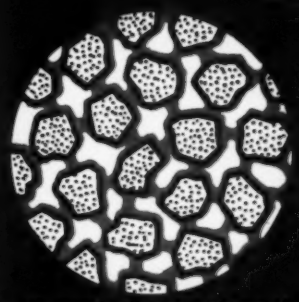
• Established 1858 •

O

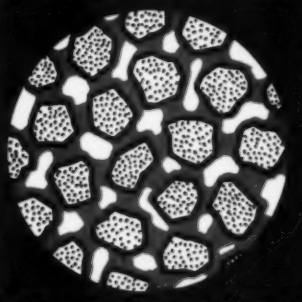
ed

1947

Here's How We Fit a Pulpstone *to Your Particular Job*



This schematic diagram shows that a pulpstone is composed of grains of abrasive (dotted) held together by "posts" of bond (red) and with voids or open spaces between them.



This diagram shows another pulpstone of the same grit (grain size) and structure (grain spacing) but of a harder grade as indicated by the thicker and stronger bond posts.

FIRST we select the correct abrasive — Alundum stones are best for some mills, 38 Alundum for others and Crystolon stones for still others.

Next comes the choice of grit size — fine grit stones for book papers, coarse grit for newsprint or insulating board.

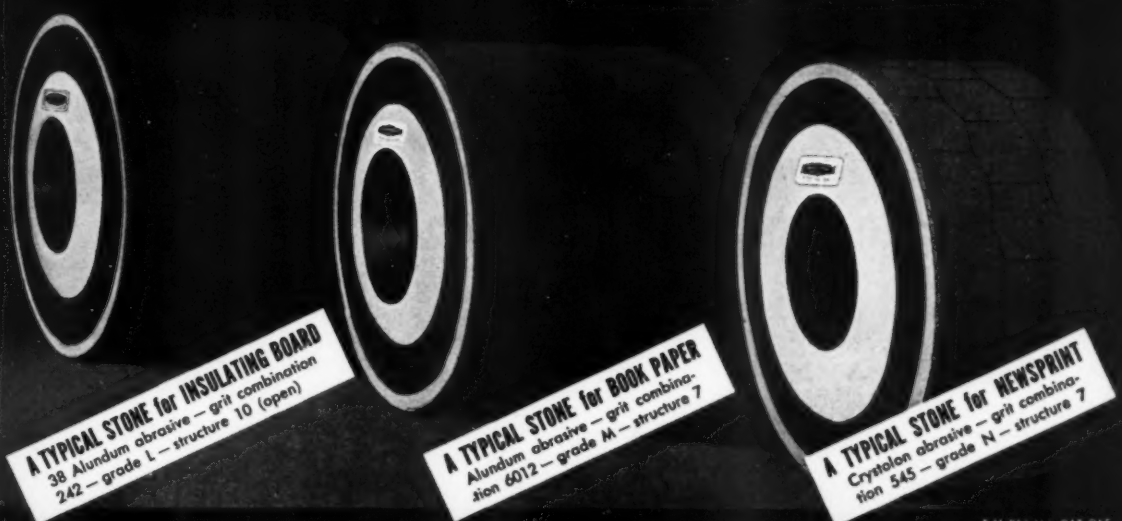
Then comes the selection of the correct grade which, in grinding wheel terminology, means the hardness of the stone. And this matter of hardness is not determined by the hardness of the abrasive (that remains constant) but by the amount of bond which holds the grains together. The more bond the harder the stone.

The fourth variable is the structure of the stone — the spacing of the grain by the Norton Controlled Structure process. For example, an open structure stone (wide grain spacing) is used for producing insulating board, and more dense structures for newsprint and book papers.

Yes, your Norton Pulpstones are "tailor-made" for their job — to produce *your* type of pulp from *your* type of wood with *your* type of equipment.

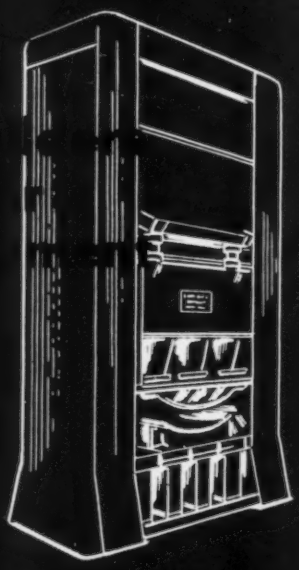
NORTON COMPANY, WORCESTER 6, MASS.
Norton Company of Canada, Ltd., Hamilton, Ont.

NORTON ABRASIVES

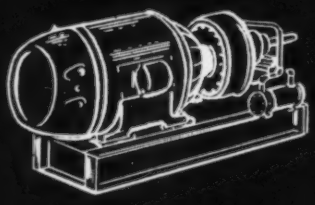

A TYPICAL STONE for INSULATING BOARD
38 Alundum abrasive — grit combination 242 — grade L — structure 10 (open)
A TYPICAL STONE for BOOK PAPER
Alundum abrasive — grit combination 6012 — grade M — structure 7
A TYPICAL STONE for NEWSPRINT
Crystolon abrasive — grit combination 545 — grade N — structure 7
T.M. REG. U.S. PAT. OFF.

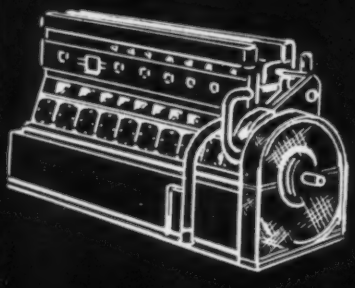
Some very important reasons...

why so
Machiner
select ROS
Original Eq



ROSS "BCF" COOLERS





Machinery builders show a heavy preference for the Ross "BCF" design for cooling oil, water and other fluids up to 250 GPM. Accordingly, a high percentage of Diesels, compressors, hydraulic presses, torque converters, reduction gears and turbines includes this Ross cooler as original equipment.

Why Ross? Why the "BCF"? For the same reasons that thousands of *USERS* have made this selection for many, many years:

- *Small, light weight, compact.*
- *Strong, durable, corrosion resistant.*
- *Made entirely of non ferrous materials.*
- *High heat transfer rate.*
- *Features adaptable to individual needs.*
- *Easily inspected and cleaned.*
- *Simple to install.*

FREE ON REQUEST
Complete details in Bulletin 4922. Write on your Company letterhead.

ROSS HEATER & MFG. CO., INC.
Division of American Radiator & Standard Sanitary Corporation
1430 WEST AVE. BUFFALO 13, N. Y.

Why

No single type of dryer felt will meet the needs of all mills. But HOOPERWOOD "Canvas Engineering" has the answer to that problem—a specific HOOPERWOOD Dryer Felt for each requirement.

If it is a rugged, heavy felt you need for fine finish in normal production . . . or a lightweight, extra-porous felt for faster drying . . . or an Asbestos Felt to withstand advanced temperatures in high speed production of Kraft and other heavy papers—there is a HOOPERWOOD felt to fit your need.

Mill Superintendents find this service invaluable in suiting the particular requirements of their mill—even down to each machine position if desired.

Make your next felt *right*—specify HOOPERWOOD.

WM. E. HOOPER & SONS CO.

New York **PHILADELPHIA** Chicago

Mills: WOODBERRY, BALTIMORE, MD.

Engineered

Photo courtesy of the Pusey and Jones Corp.

HOOPERWOOD DRYER FELTS

COTTON AND ASBESTOS

THE AMERICAN PULP AND PAPER MILL SUPERINTENDENTS ASSOCIATION, Inc.

27th Annual Convention
Edgewater Beach Hotel
Chicago, Ill.
May 22-24, 1947

Association Office
220 East 42nd Street
New York 17, N. Y.

For Your Fine Chemical Needs

B&A MERCURIC NITRATE

Reagent

Made to Baker & Adamson's own strict Reagent specifications, this white crystalline product assays 99% min. $Hg(NO_3)_2 \cdot H_2O$. Low in iron and chloride, it offers a purity suitable for many exacting uses such as the preparation of mercuric nitrate ointments for treating skin disorders. Other applications for this material include: carroting of furs for felting into hats; manufacture of mercury fulminate used in percussion caps and detonators; ingredient of baths for producing blue-black or gray-black colors on iron and steel; manufacture of organic mercurials used for closed-system papermaking plants, for protecting soil, seeds, and wood against certain fungi and insects, and for prevention of mold formation in paints and varnishes; preparation of mercuric acetate, etc.

Rely on General Chemical's

B&A BARIUM FLUORIDE

Reagent & Technical

A superior product, low in impurities, this B&A Quality chemical assays 99% min. BaF_2 in the Reagent grade and 98% min. in the Technical. Thus, Industry has two forms of exceptionally high purity to consider for the many applications of this product. Some of these include: flux in preparation of high-copper alloys; flux or opacifier in manufacture of enamels, glass and ceramics; manufacture of heat-treating salts; as an insecticide; as an agent for insulating electrodes used in electronic cathode ray tubes; in the manufacture of arc lamp electrodes, etc.

Baker & Adamson Division

B&A ACETYL CHLORIDE

Reagent & Technical

Both grades of this B&A purity product have the same high assay of 95% min. CH_3COCl. Many users requiring quality acetyl chloride in quantity find the Technical grade meets their needs. Among the applications for this B&A Fine Chemical are: an intermediate in the manufacture of organic pharmaceuticals, i.e. heroin (diacetylmorphine); acetylating agent in the synthesis of organic chemicals such as acetophenone, acetoresorcinol, and acetamide; manufacture of acetyl peroxide.

★ This is the fourth in a series of advertisements reviewing the B&A Fine Chemicals *commercially available* to American Industry today from the Baker & Adamson Division of General Chemical Company. Scores of such purity products await your investigation. To learn more about these or other B&A Fine Chemicals that meet your requirements, write or phone nearest B&A Sales and Technical Service Office.

GENERAL CHEMICAL COMPANY

BAKER & ADAMSON DIVISION

40 RECTOR STREET, NEW YORK 6, N. Y.

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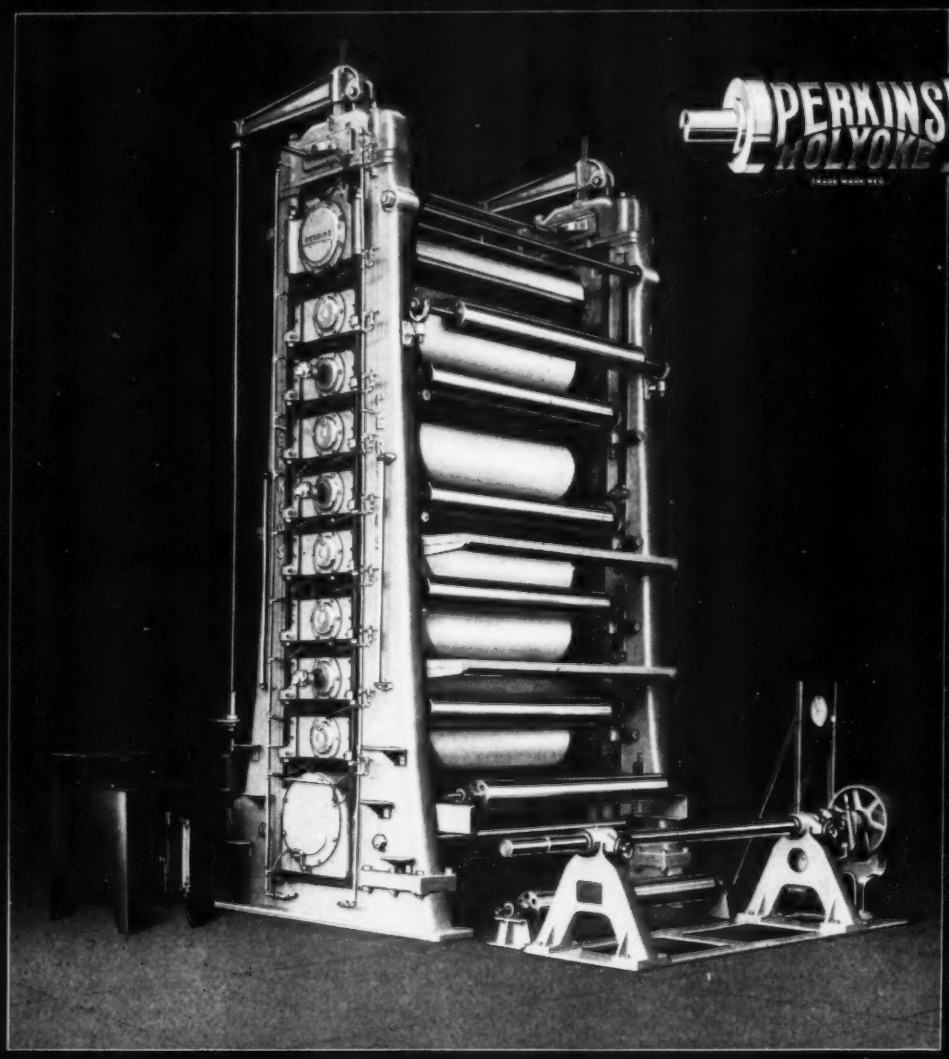
In Wisconsin: General Chemical Wisconsin Corporation, Milwaukee, Wis.
In Canada: The Nichols Chemical Company, Limited • Montreal* • Toronto* • Vancouver*

SETTING THE PACE IN CHEMICAL PURITY SINCE 1882

*Complete stocks carried here.

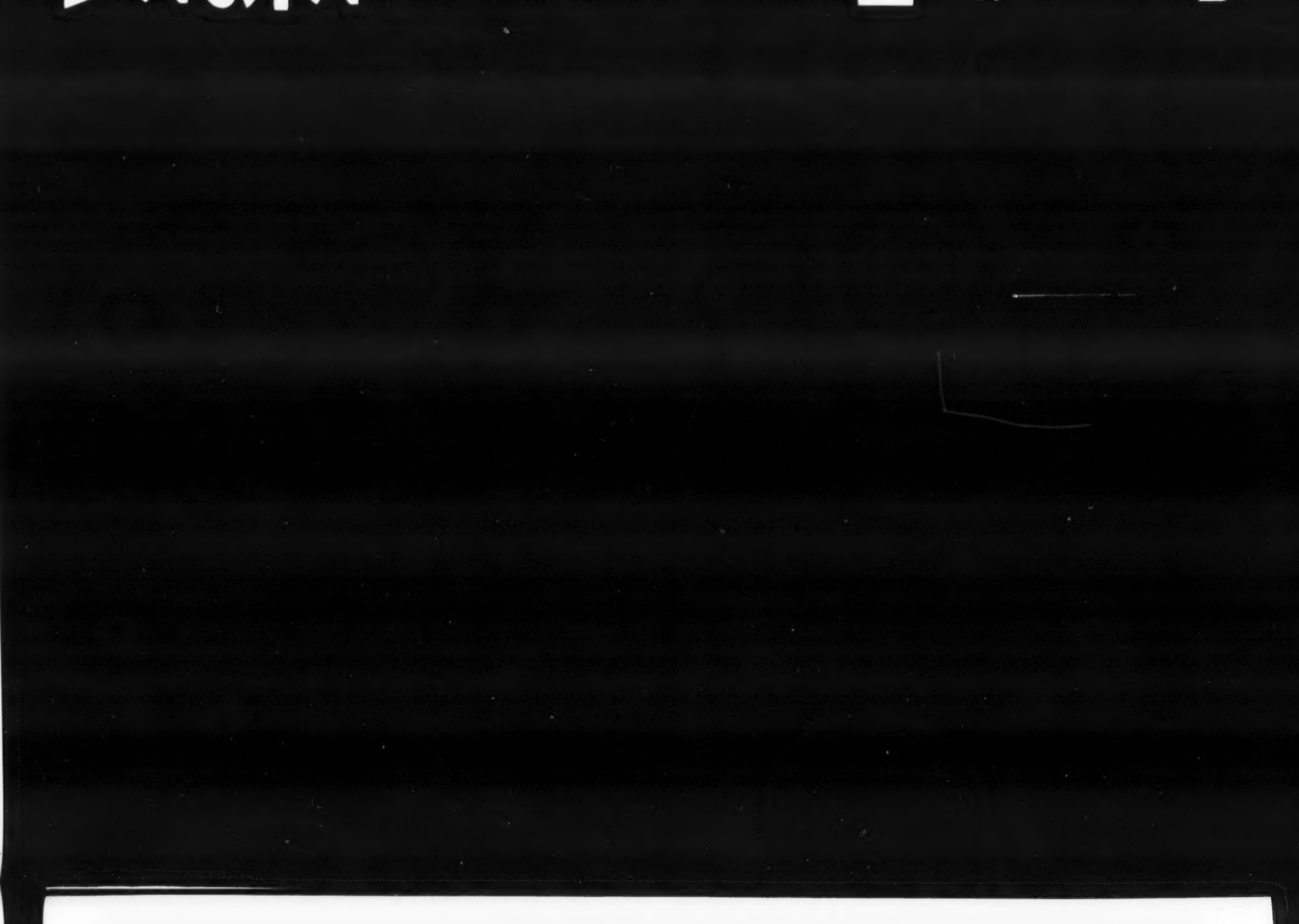


PERKINS ten-roll 74" Web Supercalender. All rolls in Timken anti-friction bearings. Forced feed oil lubrication to all bearings, with oil pumps. Foxboro air-pressure system. Motor lift for separating rolls. PERKINS CALENDERS are noted throughout the industry for remarkable endurance. . . . They are running steadily, even under the most severe operating conditions, with utmost in power economy.

B. F. PERKINS & SON, Inc.

HOLYOKE, MASS., U.S.A.

LARGEST MANUFACTURERS OF CALENDER ROLLS IN THE WORLD



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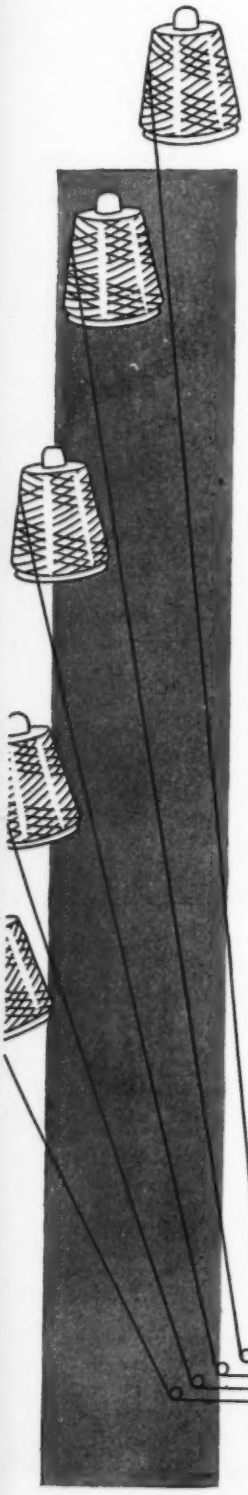
YEARS OF EXPERIENCE IN THE MAKING OF FELTS PAY OFF IN **LOWER COSTS TO YOU**



There is no substitute for experience in making paper—none in the making of felts for paper making. Your objective and ours are the same: you want to get the most out of the felt you use—the longest life possible and the lowest cost of operation. We want to supply you with the felt that will do both, and do it consistently.

To achieve our part of this program, we bring to the making of felt for you the experience of 56 years; the craftsmanship that has been handed down from father to son; the genius for selecting the virgin wools that will combine to give the greatest strength, the *tenacity* from which the name of our felts is derived: **TENAX.**

Experienced as we are, we continue to improve upon our practice just as you do. Recent reports of the performance of **TENAX FELT** in the full-out production of this postwar period confirm the fact that our research and development is paying off for our customers in longer service and lower costs.

LOCKPORT FELT COMPANY
NEWFANE, N. Y.

TENAX
"TENAX FELTS ARE TOUGH"

SERVING THE PAPER INDUSTRY SINCE 1891

What sterling is to silver . . .

Wyandotte Precipitated Calcium Carbonate is to paper-coating pigment.

When you buy Wyandotte Precipitated Calcium Carbonate you *know* that you are getting a product unequaled in brightness and freedom from grit and abrasiveness . . . in hiding power and ink absorption . . . in that uniformity which is essential to exacting coating requirements.

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It's the SIDE of a V-Belt

That GRIPS the Pulley
Picks Up the LOAD
and Really Gets the WEAR!

Diagram of V-Belt in Sheave Groove

Every ounce of load a V-Belt carries must *first* be picked up by the *sides* of the belt. Clearly so, because *only* the *sides* come into contact with the pulley! The sides do all the *GRIPPING* on the pulley. They get all the wear against the sheave-groove wall. The sides *pick up* the load. They transmit that load to the belt as a whole. And then, once more, the sides —and the sides *alone*—grip the driven pulley and *deliver* the power to it.

That is why you have always noticed that the sidewall of the ordinary V-Belt is the part that wears out first.

That's Why the CONCAVE SIDE
A GATES PATENT
is ★IMPORTANT to YOU!

Clearly, since the sidewall is the part that wears out first, anything that prolongs the life of the sidewall will lengthen the life of the belt—and that is why the patented Concave Side is important to you.

The simple diagrams on the right show exactly why the ordinary, straight-sided V-Belt gets excessive wear along the *middle* of the sides. They show also why the Patented Concave Side greatly reduces sidewall wear in Gates Vulco Ropes. That is the simple reason why your Gates Vulco Ropes are giving you so much longer service than any straight-sided V-Belts can possibly give.

Straight Sided V-Belt

Fig. 1

How Straight Sided V-Belt Bulges When Bending Around Its Pulley

Fig. 1-A

You can actually feel the bulging of a straight-sided V-Belt by holding the sides between your finger and thumb and then bending the belt. Naturally, this bulging produces excessive wear along the middle of the sidewall as indicated by arrows.

Gates V-Belt with Patented Concave Sidewall

Fig. 2

Showing How Concave Side of Gates V-Belt Straightens to Make Perfect Fit in Sheave Groove When Belt Is Bending Over Pulley

Fig. 2-A

No Bulging against the sides of the sheave groove means that sidewall wear is evenly distributed over the full width of the sidewall—and that means much longer life for the belt!

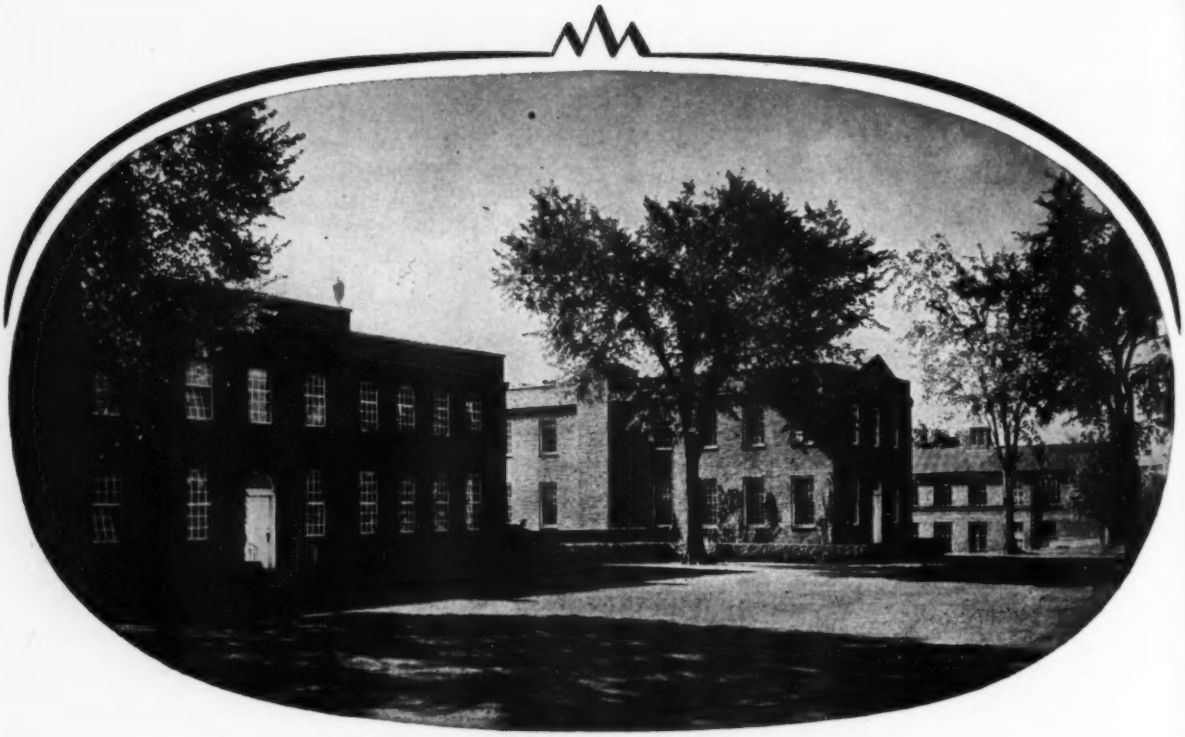
★More Important NOW That STRONGER Tension Members are Used

Now that Gates *Specialized Research* has resulted in V-Belts having much stronger tension members — tension members of Rayon Cords and Flexible Steel Cables, among others—the sidewall of the belt is often called upon to transmit to the pulley much heavier loads. Naturally, with heavier loading on the sidewall the life-prolonging Concave Side is more important today than ever before!

THE GATES RUBBER COMPANY Denver, U. S. A.
"World's Largest Maker of V-Belts"

475

GATES VULCO V-ROPE DRIVES
Engineering Offices and Jobber Stocks **IN ALL INDUSTRIAL CENTERS** of the U. S. and 71 Foreign Countries
Gates
THE MARK OF SPECIALIZED RESEARCH



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R. T. VANDERBILT CO., Inc.

230 Park Avenue, New York City

Paper Prices are Steady

▶▶▶ FOR THE FIRST quarter of the year, the production of paper products made an over-all advance of 15 per cent over the same period in 1946. In both paper and board, the production was up to capacity of facilities. However, consumption of paper products is insatiable, all production passing into current absorption with nothing left over and consumers pleading for more. There has not been a better test period for capacity production to show what it could do than the first three months of this year. In March, paper production averaged 106.5 per cent for a six-day week and board, 102.2 per cent. But hungry consumers lapped it all up and reports from all sections of the country are that paper products of every classification are in acute demand.

That is the background in the paper industry which must meet the Administration's general campaign for price-cutting in all industries. The campaign states that all prices are too high and, therefore, should be cut.

If instead of conducting such a campaign against prices, the government should tell the consumers of the United States why prices are high and what the conditions are that cause prices of commodities to rise, it would be rendering a service of great value. It would be difficult to convince consumers that the constant upping of wages, the policy of the Administration in subsidizing agricultural products, the exporting of our products to foreign countries by the billions of dollars worth via U.R.A., lend-lease, the export-import bank, and direct appropriations (like those to Greece and Turkey) have nothing to do with the upping costs of living in America. Little or nothing is said by the Administration of these conditions. Why not? Simply because they are the factors that are keeping prices up.

Nobody takes daily education in how to buy, when to buy, and what to buy so intensively as do the thirty-five million housewives of this country. They know prices when they see them and qualities also. They work on budgets; they look for bargains; they have just so much to spend and it has to keep the family. They do it.

They need no national official or commission to tell them about prices. They know about them. They keep the wheels of industry and commerce moving and, "believe it or not," they are not going to give the Administration's price campaign anything more than a sympathetic nod of recognition and then pass right on to do their marketing every day at prevailing prices.

There is, of course, no formula by which the maladjustments wrought on our economy and the economy of the world can be specifically and speedily remedied. The singling out of prices and pointing the finger of scorn at the manufacturers; the attempt to pillory them as the scamps that have done the consumers a scandalous wrong, is a mistaken concept.

Prices are mere indices of the relation of demand to supply. If demand for a commodity is greater than the supply, the price automatically rises. When the supply exceeds the demand, the price declines. Price, therefore, moves only as the conditions in industry change. Commodities of many kinds are and have been in short supply. Their prices have gone up. They will stay up until the conditions change from scarcity to plenty.

And that goes for the paper industry also. However, the price record between the mills and the legitimate market is remarkable for its conservative course.

The question of great import in the paper industry is not price, but "where can we get the paper we need?" That is going to be the outstanding factor for a long time to come.

Management—What Are You Telling Your Employees?

▶▶▶ MARTIN DODGE, of Dodge and Mugridge, New York Public Relations Counsel, in talking before a recent meeting of the American Management Association, related that management not only fails to get its message across to employees but seems to be in doubt as to what its message is.

According to Mr. Dodge, "employees are interested in information, not propaganda or argument." In his opinion, employees should be told the facts about profits and about wages and salaries. Likewise, it is his feeling that employees should be made acquainted with company plans at the earliest possible moment—that their security is at stake, and that uncertainty and worry mean inefficiency.

It has been reported that there has been a dropping off in worker productivity in recent years in the pulp and paper industry. No doubt there are a number of factors responsible for this condition; and it may be, at least in certain instances, that this failure to furnish employees with the right information is one of them.

Someone has said, in speaking on this same general subject, "Keep Channels of Communication Open." How can such channels be kept open where secretiveness breeds distrust. Possibly, management needs to become more interested in broadening its human interest base as it concerns employees—to give employees the same sort of consideration that is given customers. If that is done, the matter of imparting the right sort of information to them should not be too difficult.

International Co-operation

WILLIAM SIBLEY

▶▶▶ MOST OF US HAVE had little difficulty recognizing the logical end result of international co-operation. The majority readily acknowledge the crying need for such unified effort. But when on every side we see little boys, dogs, wild animals, fish, ants—*everything in Nature*—fighting and struggling for self-interest, gain or sheer survival, such organizations as the Hague Tribunal, the League of Nations, the World Court or the United Nations, finds us left a bit cool to the prospects of any immediate success. In the last 1,400 years, there have been only six years during which some sort of war was not in progress. In spite of good intentions and the teachings of high-minded ecclesiastics we have fought a major war once every generation—and there is little evidence of a basic change in humanity.

What has happened is the rise of completely changed world conditions. There was a time when nations could recover from a major war in a generation. With the technological advances which have rendered war a thousand times more costly and devastating, such recovery is no longer possible. And not only wars become too costly, but the implements used to win them are obsolete today.

As of two years ago, when the founders of the United Nations met in San Francisco, the old balance of power in Europe vanished. That was because Britain lost her naval supremacy. For generations Britain stood at the fulcrum of the scales on which Germany and France offset one another. If the scales tipped towards European domination by any one power, Britain would shift her weight to restore the balance. That is how Britain averted a major war in Europe for 44 years (1870 to 1914) and again for 21 years (1918 to 1939). But now that buried deep in the rubble of Europe we find many shattered illusions, we must realize that England no longer possesses the balance of power; that all previous calculations of Britain's influence must be jettisoned by the rise of Russia as the continental dominant.

Today an entirely new balance of power exists and whether we like it or not it is in Uncle Sam's lap. From training dating back to G. Washington's warning against "entangling alliances," and long years of successful isolation behind our Atlantic barrier, we shy from the very thought of such responsibility. But wanted, or unwanted, the international seesaw has lengthed to span the Atlantic. If we do not accept the responsibility for world leadership, which Britain has carried for generations, Russia will.

U. S. power is already spread over the planet. It is up to us to keep it there, and in places spread it still farther—in other places clinch it tighter.

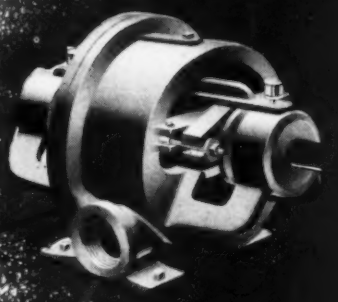
At the founding of the United Nations, Soviet power east of the Stettin-Trieste line was obsolete. Whether it would reach farther into the West and, if so, how far, was a matter of conjecture and grave concern. The final frontiers of Soviet influence in Europe are still unsettled, but they are slowly receding. U. S. power is even now pushing Russian boundaries back to the former frontiers. Many Europeans, however, who welcome the setback to Soviet expansion are and will be skeptical of any new American doctrine. When we support democracy and freedom in Turkey, Greece, Palestine, or wherenot, some Europeans will rather eagerly read into our actions such words and thoughts as military bases, markets, oil, minerals. Thanks to Soviet training there are, in Europe, several definitions of "democracy."

Recently, Russia is showing a more retiring disposition. In Iran the pro-Soviet movement collapsed in a gasp. Stalin's bid for a naval base at the Dardanelles is no longer a burning question because a Soviet challenge to Turkey now becomes a challenge to the United States. Russia's proposed trusteeship over Tripolitania has exploded like a soap bubble. Even in Europe, Soviet influence is constantly on the defensive. Political upsets are frequent, and it is openly conceded that when Russian troops are withdrawn from Austria and Hungary, those countries will annex themselves to the U. S. influence.

On the Russians' side of the ledger there is the strong anticapitalistic fervor that pervades all economic levels from day-workers to intellectuals. By far the overwhelming majority of Europeans (including English) firmly believe in some sort of planned socialist system. They may disagree as to method but they believe there is no freedom possible by reinstating private enterprise or monopolies of utilities and basic industry such as mining. For all Europeans Russia represents socialism and the U. S. represents capitalism. So long as that basic difference exists there will be no high, smoothly-paved road leading to the American system.

We must even be especially careful of our British relations. "Britannia Rules the Waves," "The Sun Never Sets on the British Empire," "The Pound-Sterling is the World's Currency"—those and other dearly beloved slogans have lost their meaning. Naturally, the British resent this. They decry the crumbling of the Empire. Some feel that they are fish caught in the American net; that in some inexplicable way the U. S. is to blame for their position. They cordially resent being Uncle Sam's poor relation.

The road ahead for U. S. is long and arduous. But if we don't take it—and travel fast—Russia will.



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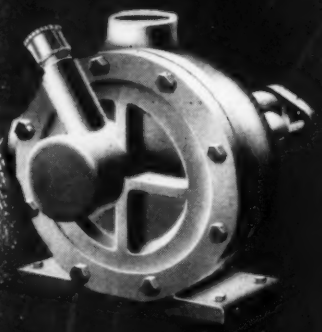

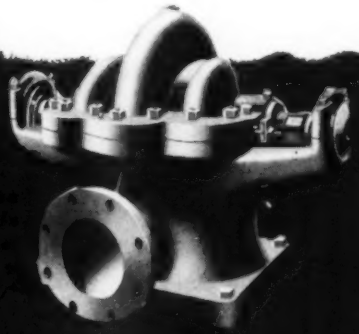

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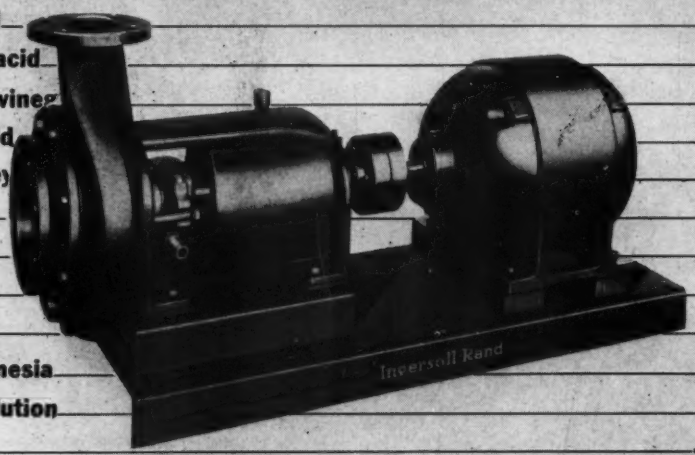
DOCTOR OF pH

pH	Water solution	H ion conc. g-mol/l
0	hydrochloric acid	1.0
1	sulfuric acid	.1
2	phosphoric acid	.01
3	acetic acid (vine	.001
4	carbonic acid	.0001
5	boric acid (e)	.00001
6	milk	.000001
7	pure water	.0000001
8	baking soda	.00000001
9	borax	.000000001
10	milk of magnesia	.0000000001
11	ammonia solution	.00000000001
12	lime	.000000000001
13	washing soda	.0000000000001
14	caustic soda (lye)	.00000000000001



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HYDRAULIC DESIGN that results in the utmost in economy and power savings.

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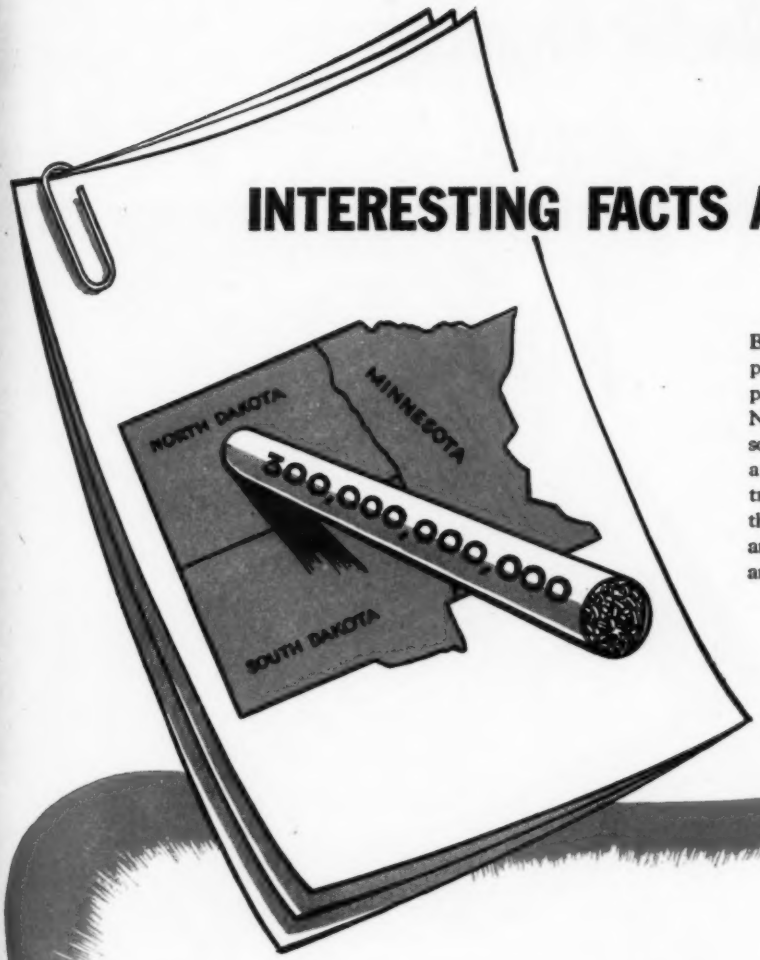
INTERESTING FACTS ABOUT PAPER



Before the war the United States was dependent on outside sources for cigarette paper, made entirely from linen rags. Now, seed flax, grown mostly in Minnesota and the Dakotas, is utilized to make a thin, strong, white paper for the country's 300 billion cigarettes, and most of those smoked in South America, Europe, and the Far East, as well as for books, and even national currency.

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Acid Orange Y is one of the most extensively used acid colors. Its brilliant shade, excellent solubility, and economy make it suitable for all types of coloring—beater, calender, dipping, and coating.

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We've increased the size of our General Products List from 4 to 20 pages. Several new products have been added and you will want to be brought up to date on our chemicals. The increase in pages comes from an endeavor to make it easier for you to get the information you want about Hooker Chemicals.

Larger type, graphic formulas, and a new format facilitate your finding the chemicals in which you are interested. Included are description, principal physical and chemical properties, uses, and shipping containers. This new products list also describes briefly the various chemical processes and facilities which Hooker has available for industry.

You who are not yet acquainted with Hooker Chemicals will find this new Products List an excellent introduction to a source for industrial chemicals of high purity; it will also pay you to refer to this Bulletin whenever you need chemicals. Feel free, too, to call on Hooker's Technical Staff for advice and help on the application of Hooker Chemicals to your problems.

The words "Bulletin 100" on your business letterhead will bring you a copy of the Hooker General Products List.

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Instruments and push-button equipment come all assembled, wired and piped . . . ready for easy connections with power, air, valves and pumps. Instrumentation in this pre-engineered cabinet form has eliminated installation headaches.

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2—The process was applicable to high tensile steels.
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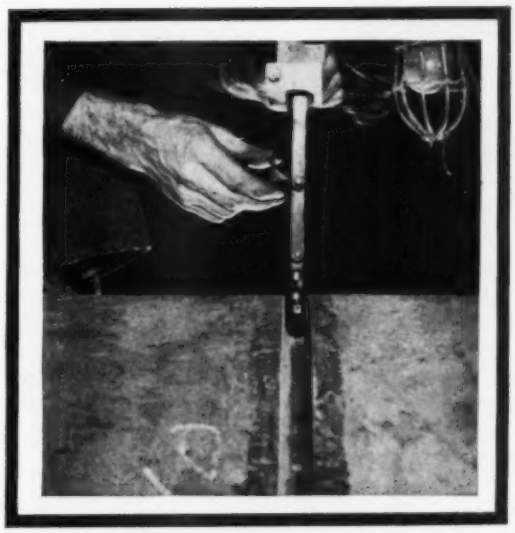

Considerable practical experience with this technique, augmented by the development of specially designed equipment, constitutes a distinct advancement in the art of welding, offering new advantages to designers of welded structures.

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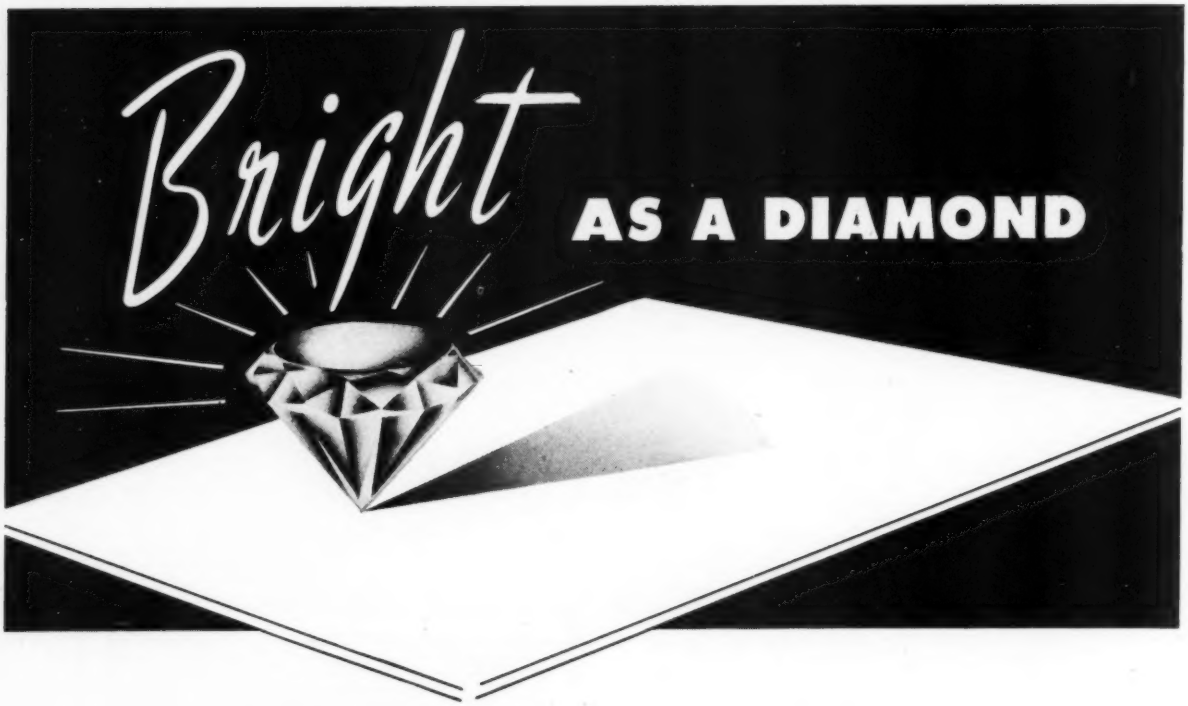


AND JUST AS SMOOTH

With Kelgin* you assure a paperboard surface perfectly sized for denseness and smoothness. It forms an excellent film barrier, insuring high gloss and full ink brilliance.

Kelgin is easy to handle, soluble in both hot and cold water. It is adaptable to water box application in the calender stacks. There is no picking, foaming or sticking to the rolls. When your sheets are sized with Kelgin your curl problem is eliminated or greatly reduced. Back sizing is not required for Kelgin sized sheets.

Kelgin is a rigidly-processed product of nature, free of impurities. It is extremely economical. Our technical department is at your service to discuss the adaptation of Kelgin to your application.

KELCO COMPANY

*Reg. U. S. Pat. Off.

20 N. Wacker Drive
CHICAGO-6

31 Nassau Street
NEW YORK-5

530 W. Sixth Street
LOS ANGELES-14

Cable Address: KELCOALGIN—New York

MAYBE YOU'RE NOT INTERESTED IN PINEAPPLE JUICE

. . . *but*

you may have the same problems of contamination, corrosion, suspended solids and mechanical remote control which prompted the engineers of The Dorr Company to select Grinnell-Saunders Diaphragm Valves for the Dorrco De-Ionization System for the new plant of the Hawaiian Pineapple Co. in Honolulu.

YOU, too, may find your answer to valve troubles due to corrosion, contamination or suspended solids in

GRINNELL-SAUNDERS DIAPHRAGM VALVES

ISOLATED WORKING PARTS

The flexible diaphragm isolates working parts of the valve from the fluid, preventing contamination or corrosion.

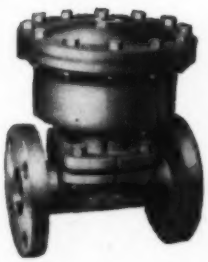
CORROSION-PROOF LININGS

A selection of diaphragm materials and also body linings of glass, porcelain, lead, rubber or synthetics to suit service requirements.

STREAMLINED FLOW . . . POSITIVE CLOSURE

Streamlined passage without pockets minimizes friction. Large area of contact of the diaphragm, plus diaphragm resilience, permit positive closure even when solids are trapped.

Standard valve available in screwed and flanged types.



Neoprene-lined, piston-operated valve specified by The Dorr Company for mechanical remote control.

Write for catalog—Grinnell-Saunders Diaphragm Valves

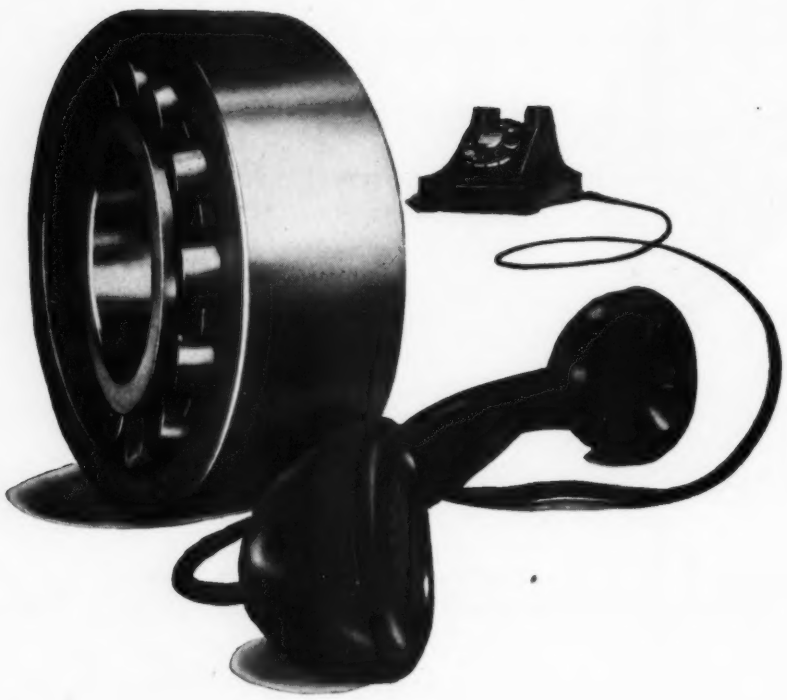
GRINNELL COMPANY, INC.
Executive Offices: Providence 1, R. I.

Branch Warehouses

Atlanta 2, Ga.	Los Angeles 13, Cal.	Seattle 1, Wash.
Charlotte 1, N. C.	Minneapolis 15, Minn.	San Francisco 7, Cal.
Chicago 9, Ill.	New York 17, N. Y.	St. Paul, Minn.
Cleveland 14, O.	Oakland 7, Cal.	St. Louis 10, Mo.
Houston 1, Tex.	Philadelphia 34, Pa.	Sacramento 14, Cal.
N. Kansas City 16, Mo.		Providence 1, R. I.

GRINNELL

WHENEVER PIPING IS INVOLVED



Unit construction . . .

is a familiar feature of the modern telephone handset which is equally advantageous in the Torrington Self-Aligning *Spherical* Roller Bearing. Its unit design

Assures easier handling . . .

speeds assembly, cuts installation and maintenance costs. In addition, the *Spherical* Roller Bearing features high radial capacity, two-directional thrust capacity and free-rolling self-alignment that assures efficient operation under conditions of shaft deflection or similar causes of misalignment.

You can turn these and other important advantages to your benefit. Send for our Bulletin #200, which contains complete engineering data on the *Spherical* Roller Bearing.

THE TORRINGTON COMPANY

SOUTH BEND 21, INDIANA TORRINGTON, CONN.

Offices in All Principal Cities

TORRINGTON BEARINGS

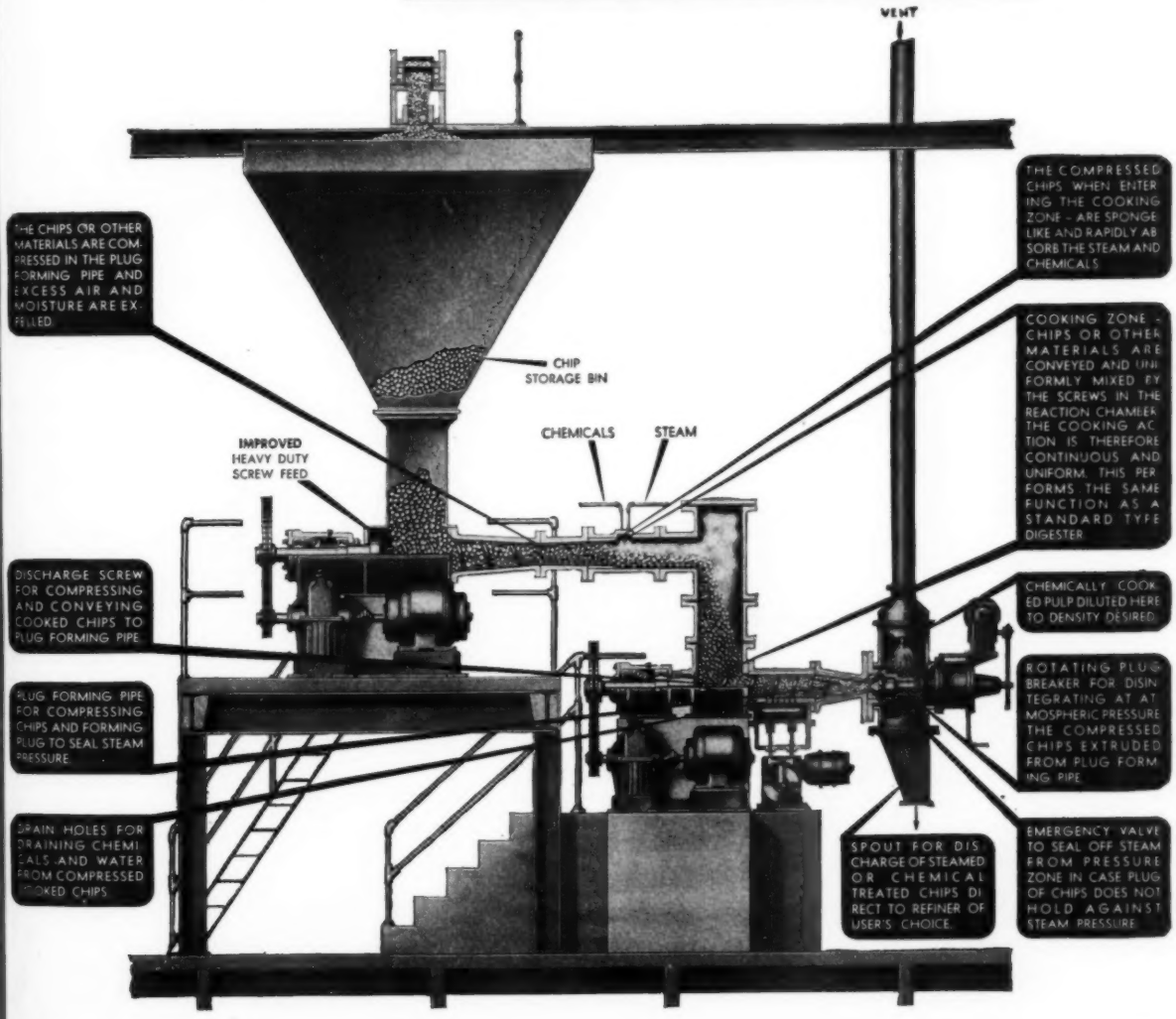
• NEEDLE • SPHERICAL ROLLER • STRAIGHT ROLLER • TAPERED ROLLER • BALL •

PANDIA FIBRILATOR

Patents applied for

Announcing

For continuous production of Wood, Straw, and Bagasse Pulps suitable for the manufacture of special fibres for industrial uses such as Insulation and Hardboard, Plastics, etc. Built for working pressures up to 300 lbs. Capacities up to 50 tons. Reasonably priced. Now in production. Refiner of customer's choice.


VENT
THE CHIPS OR OTHER MATERIALS ARE COMPRESSED IN THE PLUG FORMING PIPE AND EXCESS AIR AND MOISTURE ARE EXPELLED.
CHIP STORAGE BIN
IMPROVED HEAVY DUTY SCREW FEED
CHEMICALS
STEAM
THE COMPRESSED CHIPS WHEN ENTERING THE COOKING ZONE - ARE SPONGE LIKE AND RAPIDLY ABSORB THE STEAM AND CHEMICALS
COOKING ZONE - CHIPS OR OTHER MATERIALS ARE CONVEYED AND UNIFORMLY MIXED BY THE SCREWS IN THE REACTION CHAMBER. THE COOKING ACTION IS THEREFORE CONTINUOUS AND UNIFORM. THIS PERFORMS THE SAME FUNCTION AS A STANDARD TYPE DIGESTER
DISCHARGE SCREW FOR COMPRESSING AND CONVEYING COOKED CHIPS TO PLUG FORMING PIPE
CHEMICALLY COOKED PULP DILUTED HERE TO DENSITY DESIRED
PLUG FORMING PIPE FOR COMPRESSING CHIPS AND FORMING PLUG TO SEAL STEAM PRESSURE
ROTATING PLUG BREAKER FOR DISINTEGRATING AT ATMOSPHERIC PRESSURE THE COMPRESSED CHIPS EXTRUDED FROM PLUG FORMING PIPE
DRAIN HOLES FOR DRAINING CHEMICALS AND WATER FROM COMPRESSED COOKED CHIPS
SPOUT FOR DISCHARGE OF STEAMED OR CHEMICAL TREATED CHIPS DIRECT TO REFINER OF USER'S CHOICE.
EMERGENCY VALVE TO SEAL OFF STEAM FROM PRESSURE ZONE IN CASE PLUG OF CHIPS DOES NOT HOLD AGAINST STEAM PRESSURE

PAPER and INDUSTRIAL APPLIANCES, INC.

122 EAST 42nd STREET NEW YORK, N. Y.

Tall oil from this bubble tower brings over $60 a ton!

It's true! And kraft mills using the sulfate black liquor process are cashing in.

How?

By recovering tall oil—*which many once burned.* In the past 10 years, demand has rocketed the price of tall oil to many times its former level!

You, too, can turn this valuable by-product into extra revenue for your mill. Here's the method:

1. **Treat saponified fats and resins with sulfuric acid.**
2. **Recover free fatty acids by distillation.**

Fatty acids, of course, are corrosive. And high temperatures must also be considered in selecting materials for construction of your distilling apparatus.

But you don't have to work out those problems!

You can be guided by the hard-earned experience of the chemical industry. For fatty acid distillation equipment, they use Inconel*.

This 80 Nickel-14 chromium alloy is highly resistant to corrosion by mixed fatty acids. It has great strength and resistance to oxidation at elevated temperatures. And it does not scale or pit.

Send for free bulletin

More detailed information on the advantages of Inconel for tall oil recovery is contained in our Technical Bulletin C-3, ***Monel, Nickel and Inconel in Pulp and Paper Mills.*** If you haven't a copy of this helpful 40-page reference booklet, we'll be glad to send one at your request.

And whenever you'd like help in picking the right metal for any corrosive pulp or paper mill job, remember that Inco's Technical Staff is always ready to serve you. No fee or obligation. Just write and tell what the trouble is.

INCONEL BUBBLE TOWER *used by sulfate pulp mill for profitable recovery of fatty acids from black liquor. Inconel provides exceptional resistance to corrosion and high temperatures.* (Photo courtesy Alloy Fabricators, Inc., Perth Amboy, New Jersey.)

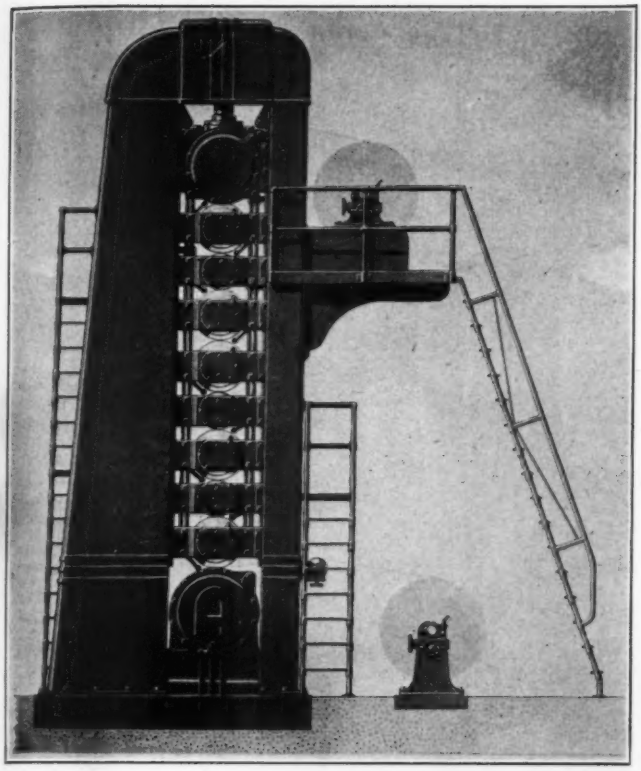
THE INTERNATIONAL NICKEL COMPANY, INC., 67 Wall Street, New York 5, N. Y.

NICKEL (INCO TRADE MARK) **ALLOYS**

Inconel*

MONEL* • "K"* MONEL • "S"* MONEL • "R"* MONEL • "KR"* MONEL • INCONEL* • NICKEL • "L"* NICKEL • "Z"* NICKEL

*Reg. U.S. Pat. Off.

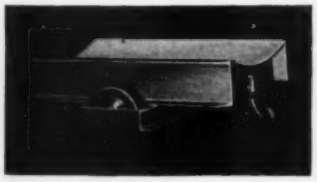


HIGH-SPEED

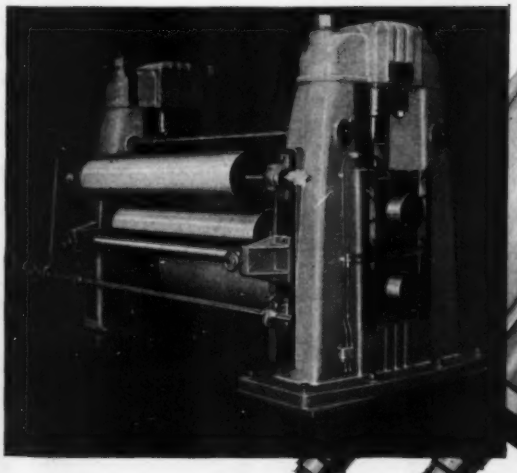
SUPERFINISHING EQUIPMENT

APPLETON has had long and highly specialized experience in all phases of superfinishing. Today it offers a complete line of equipment for the paper industry. Here are high-speed supercalenders in all sizes, from small laboratory models to huge stacks that take full paper machine widths. Here are the latest mechanical and electrical advancements for more efficient overall performance. Here is the most complete selection of filled rolls in America, a roll type for any paper or finish. Here are special process cotton rolls for coated stocks running at speeds up to 1800 feet a minute. Here is modern auxiliary equipment for reduced maintenance and reduced operating costs. For everything for superfinishing in the paper industry – see APPLETON first.

AUXILIARY EQUIPMENT— Unwind and Windup Stands, Friction Brakes, Special Roll Trucks, Etc. developed to maintain high-speed finishing,— high production.



EMBOSSING CALENDERS and Rolls, Special Stacks, Etc. all with the advanced Appleton features.



APPLETON

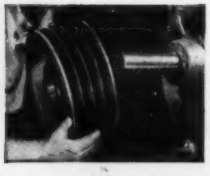
THE APPLETON MACHINE COMPANY
Appleton • Wisconsin

Western Sales
PACIFIC COAST

Eastern Sales
CASTLE AND OVERTON, Inc.

Save time . . . prevent damage to motor and shaft . . . with TEXROPE

"MAGIC-GRIP" SHEAVES



QUICKLY ALIGNED

Because it slides freely on the shaft, it's easy to line up the sheave accurately — for good alignment, smooth operating, longer belt life. It pays to standardize on "Magic-Grip" sheaves.

See Sweet's Catalog

SLIPS ON EASILY

Comes completely assembled. Tapered split bushing provides clearance for even over-size shafts — it's compressed and locked to the shaft with an all-around clamp grip by tightening three cap screws. Can be removed as easily as it goes on.

HERE'S A SHEAVE that goes on *fast*. Less labor cost — less downtime. But that's only part of the saving. There's no forcing or hammering to damage motor bearings — no set screws to mar the shaft. Locks on with a powerful clamp grip that prevents backlash or wobble. And . . . it costs no more than a standard heavy duty sheave of comparable materials and precision workmanship.

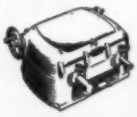
Texrope "Magic-Grip" sheaves are made in diameters from 5.4 to 48 inches, two to 12 grooves. They're engineered by Allis-Chalmers, originators of the multiple V-belt drive. For specifications, prices, call your nearest A-C dealer or office. ALLIS-CHALMERS, MILWAUKEE 1, WISCONSIN. A 2221

TEXROPE .. Greatest Name in V-Belt Drives

"Super 7" V-BELTS
Five Types — Sizes to suit every power transmission job.

Texsteel, Texdrive, "Magic-Grip"
— sheaves in a full range of sizes, grooves.

"Vari-Pitch" SHEAVES
Exact variations in speed, stationery or motion control.



SPEED CHANGERS
Speed variations up to 375% at the turn of a crank.

ENGINEERING
Finest V-Belt engineering talent in the world—at your call.

TEXROPE "Super 7" V-Belts result from the cooperative research of two great companies — Allis-Chalmers and B. F. Goodrich. They are sold only by A-C.

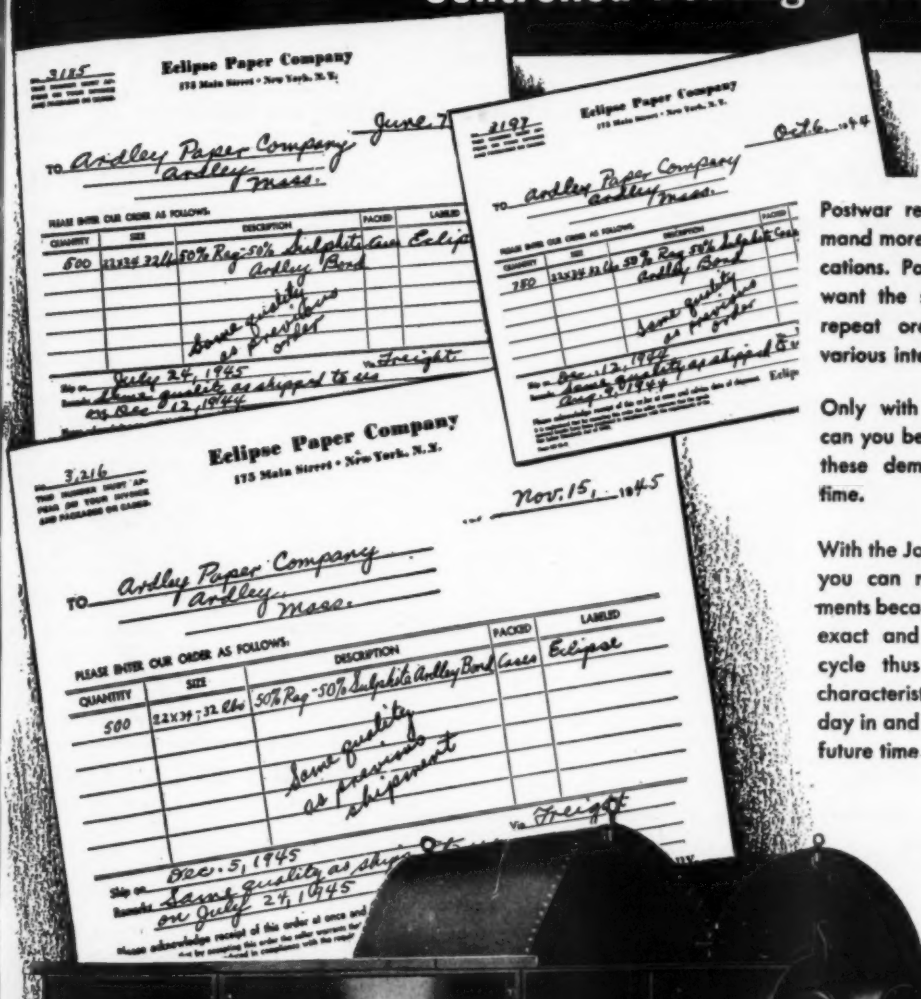
ALLIS·CHALMERS

One of the Big 3 in Electric Power Equipment — Biggest of All in Range of Industrial Products

1847 1947 A CENTURY OF SERVICE to Industry THAT MADE America Great

JONES-BERTRAMS PATENT BEATER

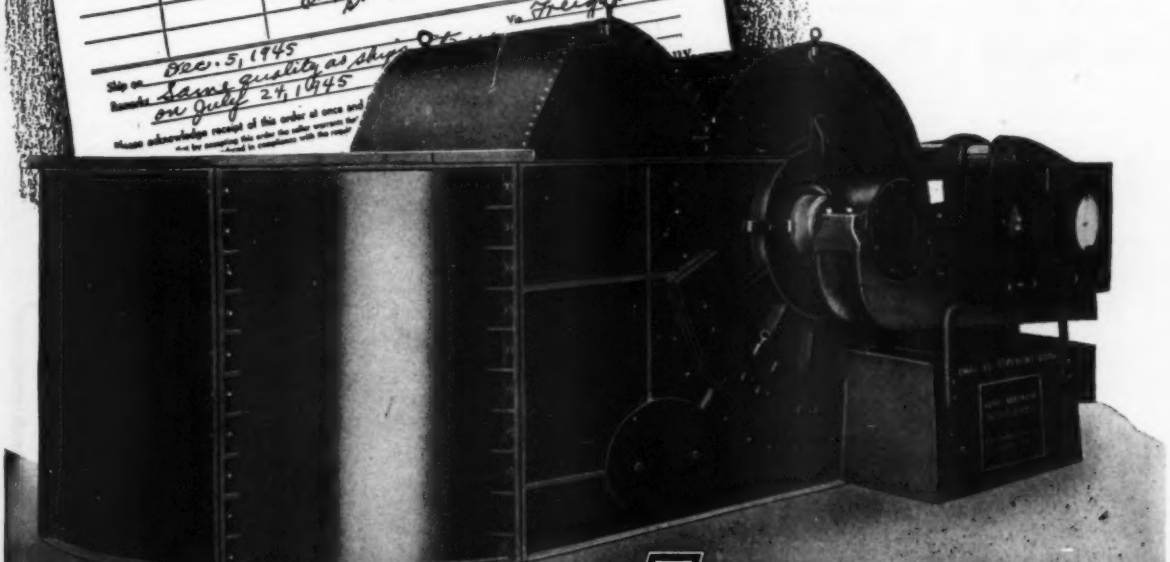
Controlled Beating Performance . . .



Postwar requirements will demand more rigid paper specifications. Paper distributors will want the same quality, when repeat orders are issued at various intervals of time.

Only with controlled beating can you be assured of fulfilling these demands from time to time.

With the Jones-Bertrams Beater, you can meet these requirements because it operates on an exact and controlled beating cycle thus reproducing stock characteristics batch after batch, day in and day out, and at any future time.



JONES-BERTRAMS PATENT BEATER

Jones

E. D. JONES & SONS COMPANY-PITTSFIELD, MASS.
Builders of Quality Machinery for Paper Mills

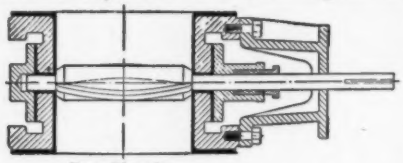
R-S valvEvents

ISSUED PERIODICALLY BY R-S PRODUCTS CORPORATION, PHILADELPHIA 44, PA., FOR THOSE CONCERNED WITH FLOW CONTROL AND SHUT-OFF

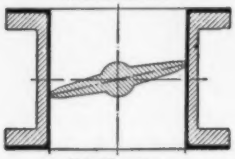
R-S Rubber Lined Valve for Corrosion Resistance and Economy

The rubber-lined valve is not to be confused with the R-S rubber-seated valve which we have mentioned in these columns.

The rubber-lined valve is a special application for anti-abrasion and anti-corrosive service. Here we have rubber, as you will see from the drawings, completely enclosing the entire body of the valve. The lining extends along the shaft and offers full protection for the stuffing-box. With this type of construction, it is possible to use an iron valve body in service that would normally call for Stainless Steel. The saving in cost is easily calculated at 60¢ to 65¢ per pound. Moreover, machining of iron is far less expensive.



Front Elevation



Side Elevation
Note angular closing disc

The disc, stuffing-box, gland, stub-shaft cover, shaft, bushings, and packing for the rubber-lined R-S Valve are, of course, made of Stainless Steel, acid-resistant bronze, or other material calculated to resist abrasion and corrosion, depending on the material to be handled. In some cases plastic parts are used.

Again, the materials to be passed through the line determine the type of rubber lining. This may be natural or synthetic rubber, hard or soft. It will provide commercially tight shut-off within proper pressure and temperature limitations. Manual and automatic prime movers of all types are available for control.

One Second to Close a 42" Butterfly Valve!

R-S Butterfly Valves are now in wide use in a variety of services, many of which require rapid shut-off for safety, economy, and generally efficient control.

The desirability of rapid shut-off depends, of course, on the type of material flowing through the system. Water and most other liquids are seldom amenable to this type of control; gases and some semi-solids often are. Frequently safety considerations demand instant control of gases, and for this purpose the R-S Butterfly Valve has unmatched efficiency.

R-S BUTTERFLY VALVES

. . . handle anything that can be pushed through a pipe-line; gases, liquids, and semi-solids.

. . . are remarkable for the speed with which complete closing can be effected.

R-S Butterfly Valves in sizes from 1" to 48" are actuated by hand or by different types of automatic control and so graduated that closing can be effected in periods of 1 second up to 10 minutes. Size of the valve has no effect on the speed of closing. Movement of the disc from full open to full closed position is through 90° of arc as a maximum, and the prime movers are designed to deliver 15 foot-pounds to 38,000 foot-pounds of torque, depending upon the requirements of the installation.

Manual controls are available in four different types; hand lever, chain lever, hand wheel, and chain wheel. In addition to hand control, there are air motors, electric motors, air, oil, and water cylinders, available with or without positioners.

For regulating purposes, you should be sure your valve is sized properly. Remember that normally the 6" R-S Butterfly Valve will do a better job than a 10" valve of other design.

Maintenance Low on R-S Valves

To consider a single point, think of stuffing-boxes. Then remember that some sizes of conventional valves require as many as 50 complete turns for full closure. The R-S Butterfly Valve closes from full open to full closed position with a single rocking motion within 90° of arc. This takes a second or 10 minutes, depending on the material controlled, size of valve, and type of prime mover. Slow or fast, the wear on R-S bushings is the minimum for all types of valves.

Moreover, all R-S Butterfly Valves are adequately bushed, though this type of valve makes less demand on bushings than any other. This relative freedom from wear has indeed been a trap for many makers of Butterfly Valves. Assuming there would be little or no wear, they have chosen false economy and built without bushings. Hence the tradition of "slap-happy dampers" and valves that "always leaked."

Not so with R-S. We bush all R-S Valves. Then, by gravy, you get service!

News from the Sales Front

R-S is pleased to announce the appointment of two new distributors:

COLORADO and UTAH

Urquhart Service, of which M. B. Urquhart is Manager, 1550 Blake Street, Denver 2, Colorado, has taken over the distribution of R-S valves for the state of Colorado and Utah.

MEXICO

Maquinaria Industrial, of which Carl N. Hermanson is Manager, Monterrey Edif., Isaac Garze Despacho, 303 Monterrey NL, Mexico, is now handling the distribution of R-S Valves in northern Mexico.

Complete R-S Valve Installation Data

Engineers like the complete dimensional data supplied for R-S Butterfly Valves. Dimensions are tabulated by standard sizes under stock types and identified by letters corresponding to detailed drawings which accompany the tables. Six full pages of R-S Products' Catalog No. 14-B (copy on request to R-S Products Corporation, Wayne Junction, Philadelphia 44, Pa.) are devoted to this basic installation data.

JWLeo F-E2

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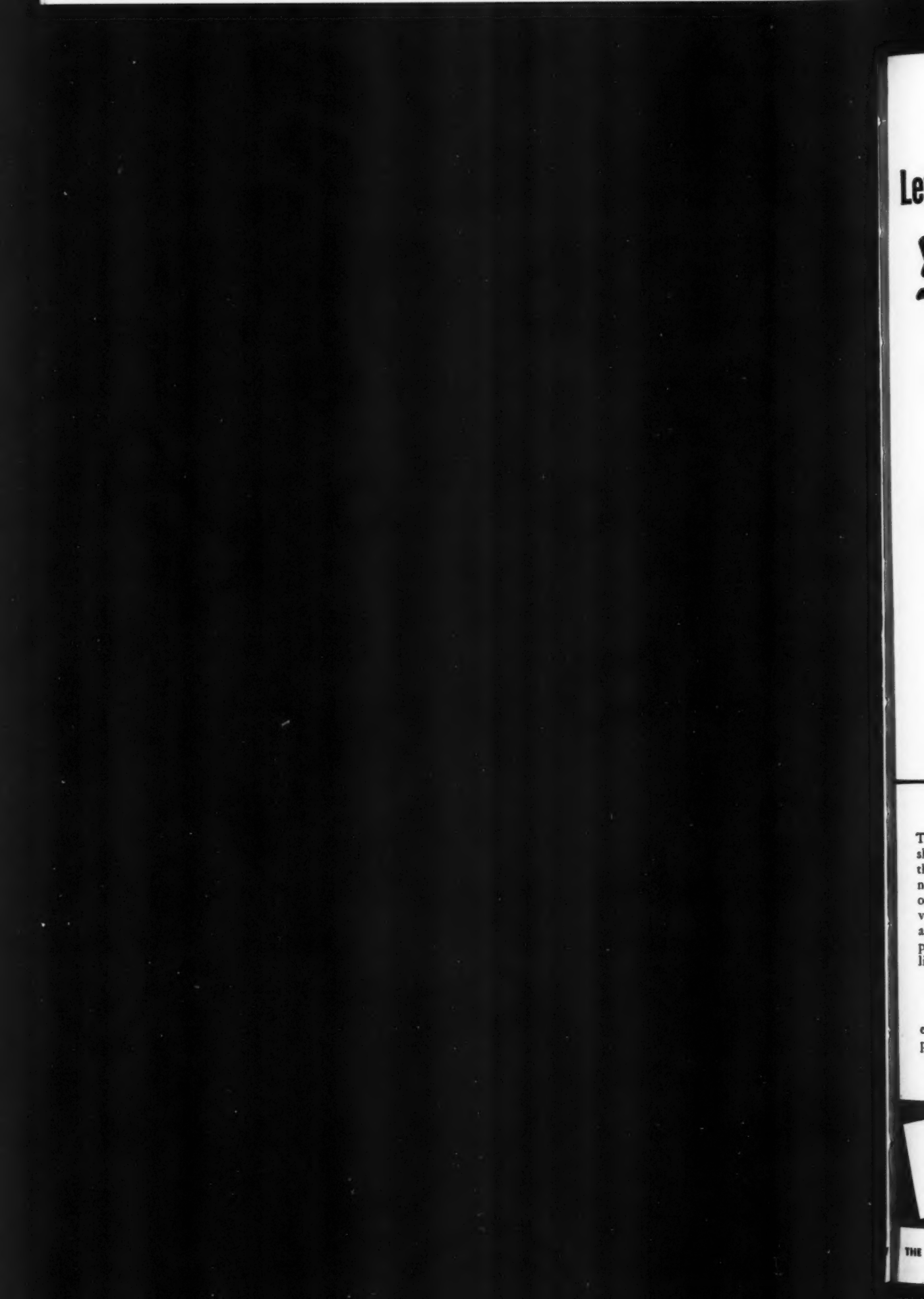
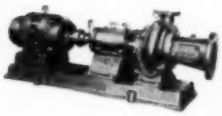
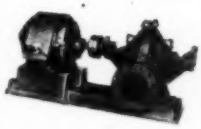
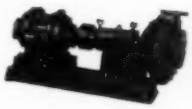
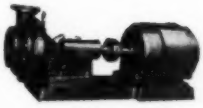
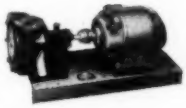


Let's Take Up YOUR Pumping Problems

Worthington Solves Them with the Specific Pump for Every Paper Processing Job

Questions	Answers	
What's the best stock pump for sulphate, sulphite, soda, ground wood, waste paper, cotton linters, etc.?		An FP pump will handle them at capacities up to 6,000 gpm, heads to 200 ft. and consistencies to 7%.
How about a good white water or fan pump?		Use L and LA pumps for all heads and capacities with consistencies up to 1%.
What's a reliable pump for green or white liquor?		A CG Worthite is the ideal pump for dissolving-tanks, transfer and causticizing.
Handling black liquor is always a big problem at our mill. What pumps are best for its various phases?		For furnace feed of black liquor with suspended coke there's nothing like a CH pump.
		For circulation and transfer of concentrated black liquor at viscosities up to 10,000 ssu, use a CL.
		Black liquor pumping for multiple effect evaporators is best handled with a CG Worthite pump.

The Worthington Centrifugal Pumps shown here are your best answers for the general run of paper processing needs. Acids, bleaches, alum, sizes and other abrasive, corrosive, viscous or volatile liquids are handled efficiently and economically by these and other pumps in the world's most complete line.

Is Your Problem Different?

But perhaps you've met with some entirely new difficulty — either in processing or such general mill service as boiler feed, condensate or fire protection.

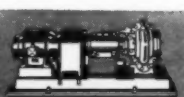
Whatever it may be, take advantage of the longest, most comprehensive experience in the field. Call our nearest district office or write to us direct. You'll get the prompt, expert cooperation on any pumping problem — no matter how unusual or complicated — that proves *there's more worth in Worthington.*

Worthington Pump and Machinery Corporation, Centrifugal Pump Division, Harrison, N. J.

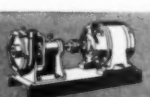
WORTHINGTON

CT-3

THE WORLD'S LARGEST MANUFACTURER OF PUMPS

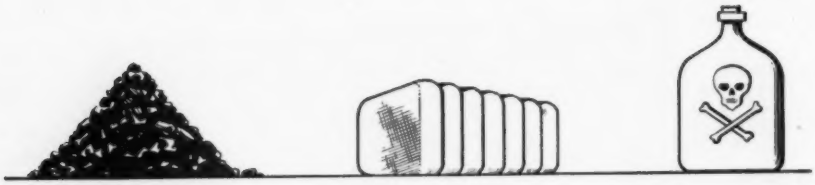


CENTRIFUGAL STOCK PUMPS Type FP. Handle all kinds of stock up to 7% consistency. 6 sizes. Capacities up to 6000 GPM; heads up to 200 ft.; speeds up to 1750 RPM.

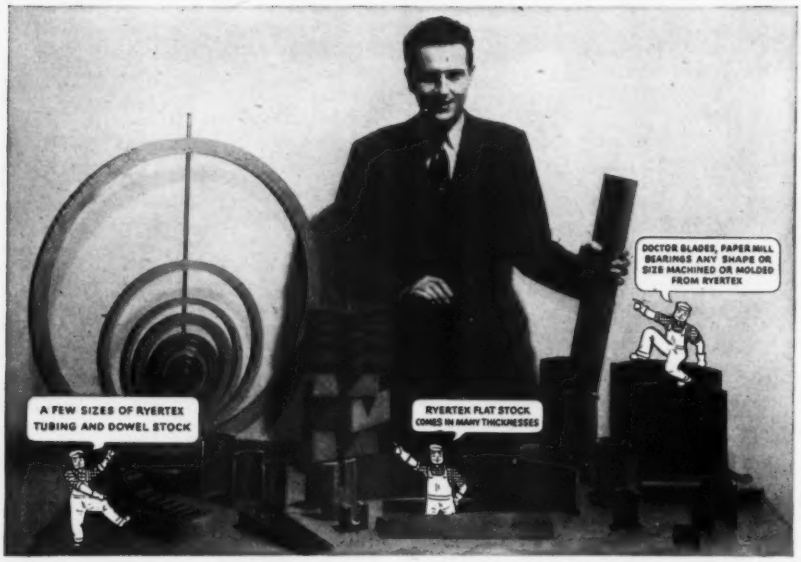


GENERAL PURPOSE PUMPS Type CF. Open impeller. Single stage. Sizes 1" to 4". Capacities up to 1000 GPM; heads up to 130 ft.; speeds up to 2475 RPM.

BOILER FEED PUMPS Type UB-2. 7 sizes. Capacities up to 1500 GPM; heads up to 1000 ft.; speeds up to 3600 RPM.



From Coal + Cotton + Alcohol


A FEW SIZES OF RYERTEX TUBING AND DOWEL STOCK
RYERTEX FLAT STOCK COMES IN MANY THICKNESSES
DOCTOR BLADES, PAPER MILL BEARINGS ANY SHAPE OR SIZE MACHINED OR MOLDED FROM RYERTEX

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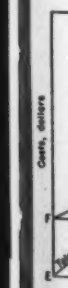


THE PAPER INDUSTRY
and PAPER WORLD
MAY, 1947

Mathematics of Profit Making

JOHN D. CORRIGAN
Corrigan, Osburne & Wells, Inc.

▶▶▶ IN RECENT YEARS, the paper industry has experienced many fundamental changes because of the need to keep it in the pattern of our national economy. Our national economy rests on the profit and loss system. In other words, free enterprise has been responsible for our progress.

The objective of our free enterprise system is constant reduction in production costs with incident price reductions, and wage increases to improve living standards. In order that this objective in a paper mill may be satisfied, prices must be kept as low as possible and wages as high as possible.

The narrowing of the gap between production costs and selling prices, particularly in a keen, competitive market, leaves no room for the inefficient producer.

A paper mill must operate efficiently if it is to operate profitably. That this may be accomplished, the smart paper executive is changing from a policy of making decisions to "show profit today" to a policy of "improving operations."

Long term efficiency with concomitant higher wages to labor, lower prices to consumer and greater net profit, is the possible result of this policy change. However, to gain this reward the use of a plan based on tested methods of improving operation is required.

Whether a pulp and paper mill executive likes it or not, he is measured by the profits of his company. Therefore, it is essential to know what causes profits.

Profit is always a result—it must have a cause. The life of a business depends upon this realization.

Mathematically speaking: Profit = Income − Cost. Therefore, executives have only two main objectives: (1) to increase sales; and (2) to reduce costs. Both of these objectives must be observed simultaneously.

The most variable factor in any business is profit. Yet few executives realize *that profit varies as a direct per cent of any variation in income.* This percentage is commonly known as the Profit Variation Ratio.

Figure 1 shows a break-even chart to illustrate this ratio. In explana-

EDITOR'S NOTE: The author is executive vice president of Corrigan, Osburne & Wells, Inc., management consultants. During the past twenty years he has assisted management on profit making problems. His experience, along with that of his associates in the paper industry, forms the basis of this article. Mr. Corrigan is a member of the leading management and engineering societies, a graduate of the U. S. Naval Academy, and an author of many articles on management.

PROFIT VARIATION CHART

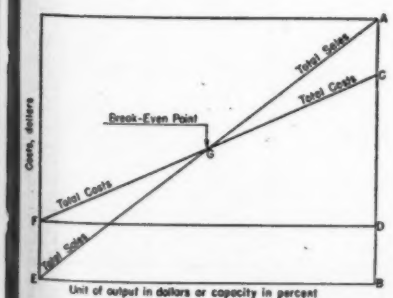


Figure 1

PROFIT VARIATION CHART

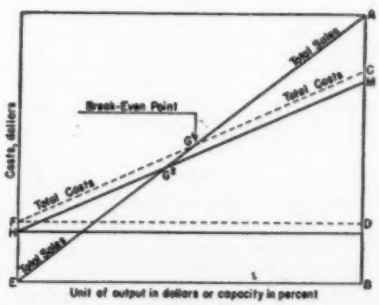


Figure 2

Figure 3

	Column A P.V.R. 20%	Column B P.V.R. 30%	Column C P.V.R. 40%	Column D P.V.R. 50%
First, assume all earnings are equal				
Sales	1,000,000	1,000,000	1,000,000	1,000,000
Variable Costs	800,000	700,000	600,000	500,000
	200,000	300,000	400,000	500,000
Constant Costs	100,000	200,000	300,000	400,000
Profit	100,000	100,000	100,000	100,000
Sales volume at which zero profits are made				
Break-even Point	500,000	666,666	750,000	800,000
Sales volume increases 25%				
Sales	1,250,000	1,250,000	1,250,000	1,250,000
Variable Costs	1,000,000	875,000	750,000	625,000
	250,000	375,000	500,000	625,000
Constant Costs	100,000	200,000	300,000	400,000
Profit	150,000	175,000	200,000	225,000
Sales volume decreases 25%				
Sales	750,000	750,000	750,000	750,000
Variable Costs	600,000	525,000	450,000	375,000
	150,000	225,000	300,000	375,000
Constant Costs	100,000	200,000	300,000	400,000
Profit/Loss	50,000	25,000	0	(Loss) 25,000
Prices decrease 10%. Volume in units increases 25%				
New P.V.R.	P.V.R. 11%	P.V.R. 22%	P.V.R. 33%	P.V.R. 44%
Sales	1,125,000	1,125,000	1,125,000	1,125,000
Variable Costs	1,000,000	875,000	750,000	625,000
	125,000	250,000	375,000	500,000
Constant Costs	100,000	200,000	300,000	400,000
Profit	25,000	50,000	75,000	100,000

tion: let the line AB equal total sales; and BC, total costs. Then, since the difference between total sales and total costs is profit, AC equals profit.

Costs can be divided into variable costs and constant costs. Variable costs move as a percentage of sales.

Two examples of variable costs are pulp and direct labor. Executives' salaries, depreciation, and other factory fixed costs typify constant costs. Regardless of sales, constant costs remain the same.

With reference to Figure 1, constant charges are represented as BD; and variable charges, as CD. Sales will move from maximum mill capacity A to zero, represented by E, thus forming the total sales line AE. Variable charges are zero at zero sales. Starting at F and running to C, the total cost line FC is formed. Total sales and total costs are equal at the point G. Point G, therefore, is the break-even point. With the two opposite angles equal at point G, and constant charges BD equal to EF, the constant charges will be absorbed up to the break-even point in the same ratio as profits are made beyond the break-even point. This ratio, called the Profit Variation Ratio, is 40 per cent for the average paper mill.

If the Profit Variation Ratio for a company is 40 per cent, every dollar of sales above the break-even point will make 40 per cent profit on that volume for the company. Explaining it in dollars: if a company with a 40 per cent profit variation ratio breaks even at $1,500,000 and does $2,000,000 in sales, its profit is $200,000. If this same company did only a $1,000,000 in sales, it would show a loss of $200,000.

Profits stop at the break-even point; losses start there at the same ratio. Does not the realization that if sales go up by $100,000, profits will go up by $40,000, stimulate sales thoughts and indicate the importance of high sales volume?

Likewise, if the same firm cited in the previous example, can effect a reduction in total costs amounting to $40,000 without a change in the profit variation ratio, the break-even point will drop by $100,000. In such a circumstance, the company will start making profit sooner so that a greater profit is realized on an equal sales volume (Figure 2).

The reverse situation is also true. Here, if costs are increased by $40,000, the break-even point is increased by $100,000.

Figure 2 is Figure 1 with the addition of the new total cost line HM after cost reduction to improve operations have been put into effect. CM is the amount of the cost reduction which moves the break-even point from G^1 to G^2.

The profit variation ratio is not the same for different companies in the paper industry. Nor is it static in an individual company. Observation has shown differences in this ratio running from 20 per cent to 50 per cent.

Calculated on the same basis as the

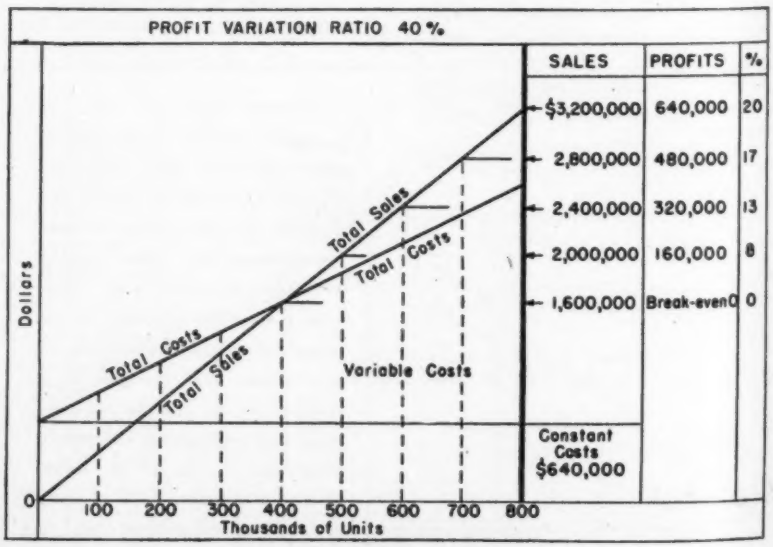


Figure 4

profit variation ratio (Figure 1), Figure 3 shows what profits a company will make under varying elements of costs during increases and decreases in economic conditions. This table indicates to the paper mill executive what can be done in expanding or contracting a business.

In setting up such a table, the assumption is made that the total cost will remain the same, and that technical improvement will merely change the proportions of variable and constant costs. Generally speaking, a technical improvement will lower the total costs and provide for more profit at the same sales volume. Suppose the figure of $1,000,000 in sales is used for simplicity and easy calculation. If a paper mill executive is accustomed to thinking in terms of five, ten or one hundred millions all that he is required to do to make the table applicable to that size business is to multiply the figures shown in the table by five, ten or one hundred, whichever the case may be.

An illustration of the use of the table might be as follows:

A pulp and paper mill executive considers modernizing his plant. The business has a profit variation of only 20 per cent. Costs and profits are shown in column A.

What would happen if the profit variation was increased to 30 per cent, column B; to 40 per cent, column C; to 50 per cent, column D, with various technical improvements which it is assumed can be engineered to the mill.

The executive will observe from Figure 3 that although profits remain constant at $1,000,000 in sales, profit making possibilities are entirely different. If sales increase by 25 per cent, the company will make 150 per cent more profit with a profit variation ratio of 50 per cent, than with a profit variation of 20 per cent. A 25 per cent decrease in sales, however, will show a loss with a profit variation ratio of 50 per cent, against a profit if the profit variation ratio remains at 20 per cent.

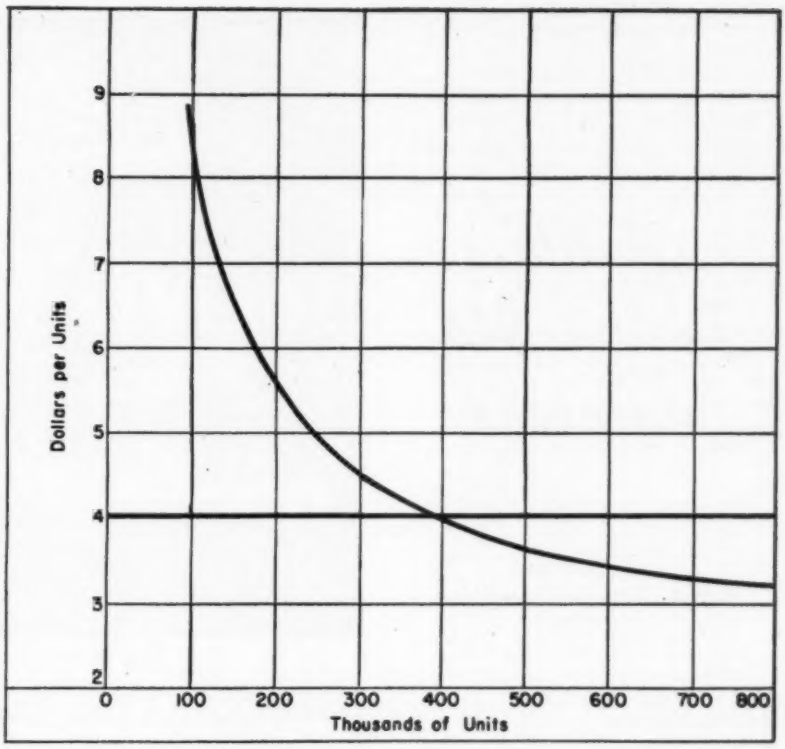


Figure 6

Next, consideration should be given to the change in profit making if a price cut is involved. If the price is cut 10 per cent and the volume goes up 25 per cent in units sold, or 12½ per cent in dollar income, the profit variation ratio changes and a profit variation ratio of 44 per cent will make 400 per cent more profit than with an 11 per cent profit variation ratio.

In another case, assume that a paper mill manufactures boxes and has a maximum capacity of 800,000 gross. The mill establishes a sales objective of 600,000 gross, at a price of $4.00 per gross; therefore, the sales objective is $2,400,000.

A large mill can assume this quota as a monthly volume; a medium size mill, as a quarterly volume; and a small mill as a yearly volume. Figure 4 shows a profit variation ratio of 40 per cent. The three columns at the right of the chart cover: Sales, Profits, and Profit Percentage to Sales. The chart indicates that the company has a profit objective of $320,000 with a $2,400,000 (600,000 gross), sales objective. If the sales objective is not met by only $400,000, only one-half of the profit objective at $4.00 per gross will be made. Thus, if sales only reach 500,000 gross, profits of the company will be halved.

Assuming that competition drops the price to $3.50 per gross, Figure 5 reveals that costs remain the same, but sales in dollars drop as the sale line pivots down. The sales line runs from zero to $2,800,000 for 800,000 gross. The break-even point moves up from 400,000 gross to 582,000 gross. The profit variation ratio drops to 31.4 per cent. *(Turn to page 213)*

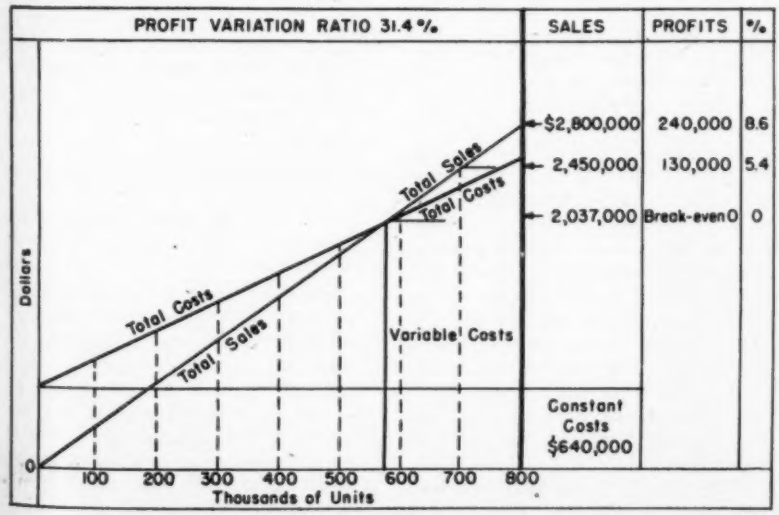


Figure 5

Abitibi Trains Its Engineers

BEN COWAN
E. & B. Cowan, Consulting Engineers

▶▶▶ PAPER MILL DESIGN engineering embraces a wide field. It covers not only (1) most branches of engineering fundamentals, but (2) also the complicated processes involved in pulp and papermaking as well. An intimate knowledge of the highly specialized techniques of the pulp and paper industry is required in the second case.

The young engineer who completes a formal education has a background of engineering theory. Upon taking a job in industry, he must study the application of the theories he has learned to the problems which may confront him. It is the reduction of such problems to their basic engineering elements and a definition of their limits which constitute what is known as engineering experience. Probably the most difficult, and often the most lengthy, part of an engineer's education is involved in this synthesis of theory and practice.

Engineers who have not had specialized courses of training have made it a common practice to obtain their knowledge of the pulp and paper industry by practical work in the operating departments of mills, or by close observation of mill operations and such study of the technical literature as was possible while filling a regular job in a mill engineering department. This procedure proved effective as long as a reasonable length of time could be allowed for the necessary breaking-in period. A succession of engineers-in-training always was available. However, the events of the past few years have altered this situation. Beginning with the depression and culminating with the war, the industry has not been able to follow former established practice. There have been no engineers-in-training to be trained.

Present day expansion and modernization requirements together with the backlog of delayed normal plant maintenance left over from the war has created an unusually urgent demand for experienced men. How to get them is a problem. Mill engineering staffs are overworked and they have less opportunity than ever to carry out training programs.

Early this year, Abitibi Power and Paper Company instituted a training course to develop paper mill design engineers, which plan, it is believed, may adjust this critical situation. The course provided a period of intensive and co-ordinated training as a substitute for haphazard experience. By this means, it was hoped to give young engineers sufficient practical knowledge within a period of three months to permit them to take over design duties on a mill engineering staff.

The personnel for this initial project included twenty young engineering graduates—mechanical, civil, and electrical, with a preponderance of the mechanical. Preference was given to war veterans. Over 60 per cent of the trainees had seen service in the Army, Navy, or Air Force. With minor exceptions, none of them had had any experience in the pulp and paper industry.

The mill of the company at Sault Ste. Marie, Ontario, was selected as the site for this training program. It is a mill with a daily capacity of 110 tons of sulphite, and 300 tons of newsprint.

Lecture and drafting rooms for the teaching program were set up in the offices adjacent to the mill itself. Through this arrangement, a complete mill was immediately available for observation and study.

Approximately three hours were devoted to lectures each day. The remainder of each day was given over to the study of equipment in the mill and to design work on typical practical problems.

The course opened with a short series of background lectures covering the history of papermaking and the economics of the industry as it concerns Canada. Following this orientation, the operations at the mill were covered first in general lectures, and then in detail by studying each particular section of the mill.

These latter lectures included detailed information covering functions of the process. They also covered details of the equipment in the mill. Both theoretical and practical aspects were emphasized.

Stress was laid on good drafting, not as an end in itself, but as the logical expression of good design. As far as possible, typical problems in design and layout and in the preparation of flow sheets were assigned. The desire was to reveal that drawing remains, as it has always been, the chief means by which an engineer can translate his ideas into concrete form.

The design information available to

a young engineer without previous practical experience is largely academic. It covers a set of conditions, calling for the application of certain formulas, and admitting only one answer.

An attempt was made in arranging design problems to duplicate actual mill conditions as much as possible. The individual problem was loose to allow latitude in design and to tax the ingenuity of the designer. This procedure was followed in order to develop the confidence of each trainee in the handling of actual problems on his own.

An attempt also was made to interest trainees in the technical literature of the industry. Groups of four men each were assigned to investigate the literature covering certain developments, processes, or other problems concerned with the mill. These assignments required a search of the transactions of the Technical Association of the Pulp and Paper Industry and of the Technical Section of the Canadian Pulp and Paper Industry, as well as of other publications. The purpose was to acquaint the trainees with published source material, with means for continuing their education, and as a method of keeping in touch with new developments. The findings of each group later were communicated to the entire class in the form of lectures and discussions.

The entire project was experimental. No previous experience in the pulp and paper industry was available as a guide. The desire was to meet a very pressing problem in a realistic manner. The results, even at this early date, indicate that the plan was worth-while to the trainees and sponsors, and to the industry as a whole.

Extended Periods of Seedfall of White Spruce and Balsam Fir*

▶▶▶ In forest management it is necessary to know when trees produce their seed. It long has been believed that seedfall of white spruce and balsam fir occurs soon after their cones ripen in late August and early September. But periodic examination of seed traps on the Superior National Forest in Minnesota during the heavy seed year, 1944, showed that seed dispersal from these conifers takes place over a much longer period—in all probability through the winter months into the following season.

Seed collections were made at daily to ten-day intervals until mid-November, and thereafter not until the following May. There was a heavy catch of balsam and a light catch of white spruce seed in the May collection, indicating that seedfall of both species continued at least until the latter part of November and probably into the winter. The course of seed dispersal as brought out by the more or less periodic collections from two traps is given in the table below.

It will be noted that whereas about seven-eighths of the white spruce had fallen by late October, only a little over half of the balsam fir seed had been shed by this time. Most of the balsam seed still remaining on the trees, or more than one-third of the total amount produced, fell sometime between mid-November and spring. Seedfall of both species was completed by mid-June.

(*) Compiled by E. I. Roe, Silviculturist, and released as No. 261 of "Technical Notes," published by Lake States Forest Experiment Station, University Farm, St. Paul, Minnesota.

Proportion of Total Amount of Seed Produced Which Had Fallen by Various Dates

Collection date	White spruce[1]	Balsam fir[2]
	Per cent	Per cent
August 23-31, 1944	0.9	1.3
September 16, 1944	7.0	10.0
September 22, 1944	22.0	26.0
October 5, 1944	35.0	32.0
October 13, 1944	49.0	43.0
October 19, 1944	79.0	49.0
October 26, 1944	87.0	56.0
November 6, 1944	93.0	61.0
November 17, 1944	93.5	62.0
May 29, 1945	99.9	99.9
June 18, 1945	100.0	100.0
July 18, 1945	100.0	100.0

MATHEMATICS of Profit Making

(Continued from page 211)

If the sales objective was set at 600,000 gross, the company would show a profit of $19,800. At 700,000 gross, a profit of $130,000 would be realized.

This example should indicate the security offered by high volume sales against the ravages of the price chiselers. It should also indicate to the sales executive how large volume sales permit price reductions without losses.

It should be evident that, although the price per gross is fixed, the cost per gross varies with the sales volume. In both Figures 4 and 5 the total cost line is the same; therefore, costs are as follows:

No. of Gross	Total Costs	Cost Per Gross
100,000	$880,000.	$8.80
200,000	1,120,000.	5.60
300,000	1,360,000.	4.53
400,000	1,600,000.	4.00
500,000	1,840,000.	3.68
600,000	2,080,000.	3.47
700,000	2,320,000.	3.31
800,000	2,560,000.	3.20

The above data are shown graphically in Figure 6. Note in the graphical presentation how costs per gross drop in the form of a hyperbolic curve as sales volume goes up. The heavy horizontal line is the price line at $4.00 per gross. By moving this price line up and down, the sales executive can determine his break-even volume at any price. The difference between the cost curve and the price line is the profit per gross. The break-even point is where the cost curve crosses the price line.

This device (Figure 6) has been used by sales executives to prove that a price reduction will increase the profits of a company through increased sales volume. Thus: if a price of $5.00 per gross is retarding sales, and the maximum volume the sales executive can obtain is 200,000 gross, the company takes a loss of $120,000, or a 60¢ loss per gross on the item. However, if the sales executive determines, through a market research and sales analysis that at a price of $4.00 he can sell 600,000 gross, the company will make a profit of $320,000, or a 53¢ per gross profit. This sort of analysis makes more sense to the president than to tell him that competitors sell at $4.00 and obviates the president's otherwise general answer to the sales executive, which is, that he does not intend to take any further loss regardless of competition.

When a pulp and paper mill executive has a knowledge of the mathematics of profit making he has a factual basis for making decisions that will improve profits.

Fig. 1—Aerial view shows relative position of yard on Fox River. Circular track and dock woodpiles may be seen in this view

How Hoberg Handles and Stores Pulpwood

RALPH C. PRATT
Hoberg Paper Mills, Inc.

▶▶▶ THE PROBLEM OF handling an average of 40,000 cords of pulpwood imported from Canada to the Hoberg Paper Mills, Green Bay, Wisconsin, was responsible for the development of a new dock and the expansion of the company's storage facilities last season.

Due to the limited navigation season, extending from about May 15 to October 15, and the necessity for expeditious dispatch associated with these cargoes, the manual system of unloading barges as in former years became increasingly troublesome. This was particularly true during the war when the manpower shortage was most acute.

Every summer it was customary for the company to hire from eighty to ninety men for part-time work in the woodyard during the summer. These men were usually obtained from the ranks of high school and college students who desired to work during their vacation. It was their function to remove pulpwood from the decks of the boats and throw it into the water. Following this operation, they hauled the wood out of the water using scows and jack ladders. This wood was then conveyed over a set of portable overhead conveyors supported on "A" frames and elevated forty-five feet. These conveyors extended 180 feet into the yard. Here the wood was dropped onto a pile. By alternating between two such sets of conveyors, the crews straightened the wood by hand on one pile while the other conveyor was operating.

It was the practice also to purchase only the deckload on these barges, because it was impractical to remove the wood from the holds by hand. The company necessarily paid a premium for these top loads. The barges, after having the deck load removed, would then be sent to another concern who purchased the load in the hold. When the manpower shortage required taking the entire boatload it was necessary to have the hold unloaded at a transfer dock into cars which were then rail switched to the Hoberg wood yard.

Early in 1945, company engineers began drawing up a plan which had been under consideration for several years. This plan involved developing the Division "B" Fox River frontage for dock purposes, the purchase of additional crawler cranes, tractors, and gondolas, and the installation of more railroad track. The Waterways Engineering Company of Green Bay, Wisconsin, was engaged to design and build the new dock structure (Figure 2).

Dredging operations began in the fall of 1945 and continued while the installation of the piling progressed. The dredge material was used as fill for the dock front. The steel superstructure was prefabricated during the winter months of 1945-46 by the Waterways Engineering Company. In the spring of 1946, the driving of 600 feet of sheet steel piling began. Anchor piling which had been driven previously was then capped with concrete, and the steel work was erected.

The trestle is built entirely of steel and concrete and is surfaced with a timber deck. It is 410 feet long, 14 feet wide, and is elevated 16 feet above the normal water level. With the use of two heavy-duty crawler cranes atop the trestle, wood is unloaded from the entire boatload into gondolas or flat cars which are then switched to stock pile locations in the woodyard. Wood intended for im-

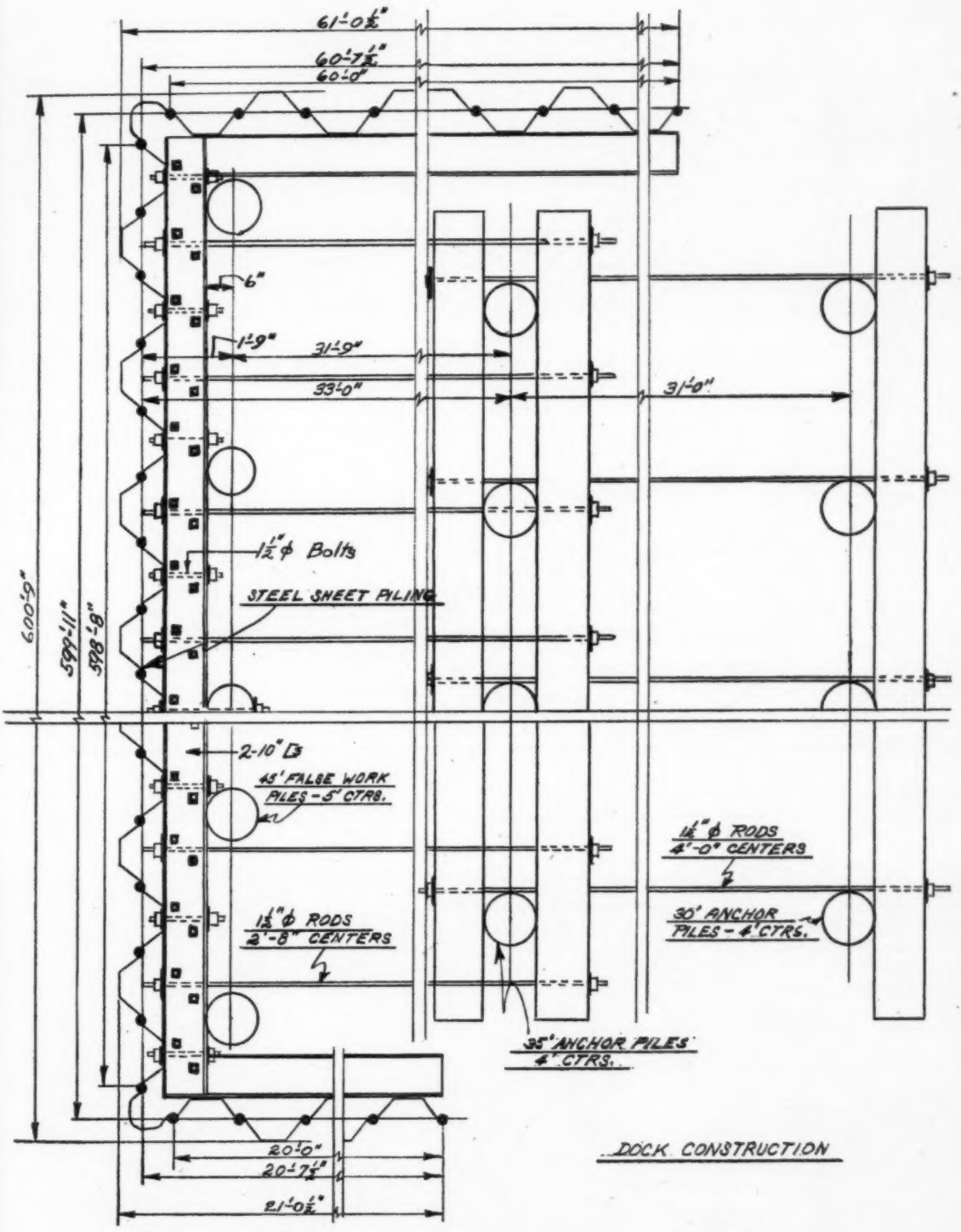

61'-0½"
60'-7½"
60'-0"
6"
1'-9"
31'-9"
33'-0"
31'-0"
1½" ϕ Bolts
STEEL SHEET PILING
600'-9"
599'-11"
598'-9"
2-10" ⊏
45' FALSE WORK PILES - 5' CTRS.
1½" ϕ RODS 2'-8" CENTERS
1¼" ϕ RODS 4'-0" CENTERS
30' ANCHOR PILES - 4' CTRS.
35' ANCHOR PILES 4' CTRS.
20'-0"
20'-7½"
21'-0½"
DOCK CONSTRUCTION

Figure 2

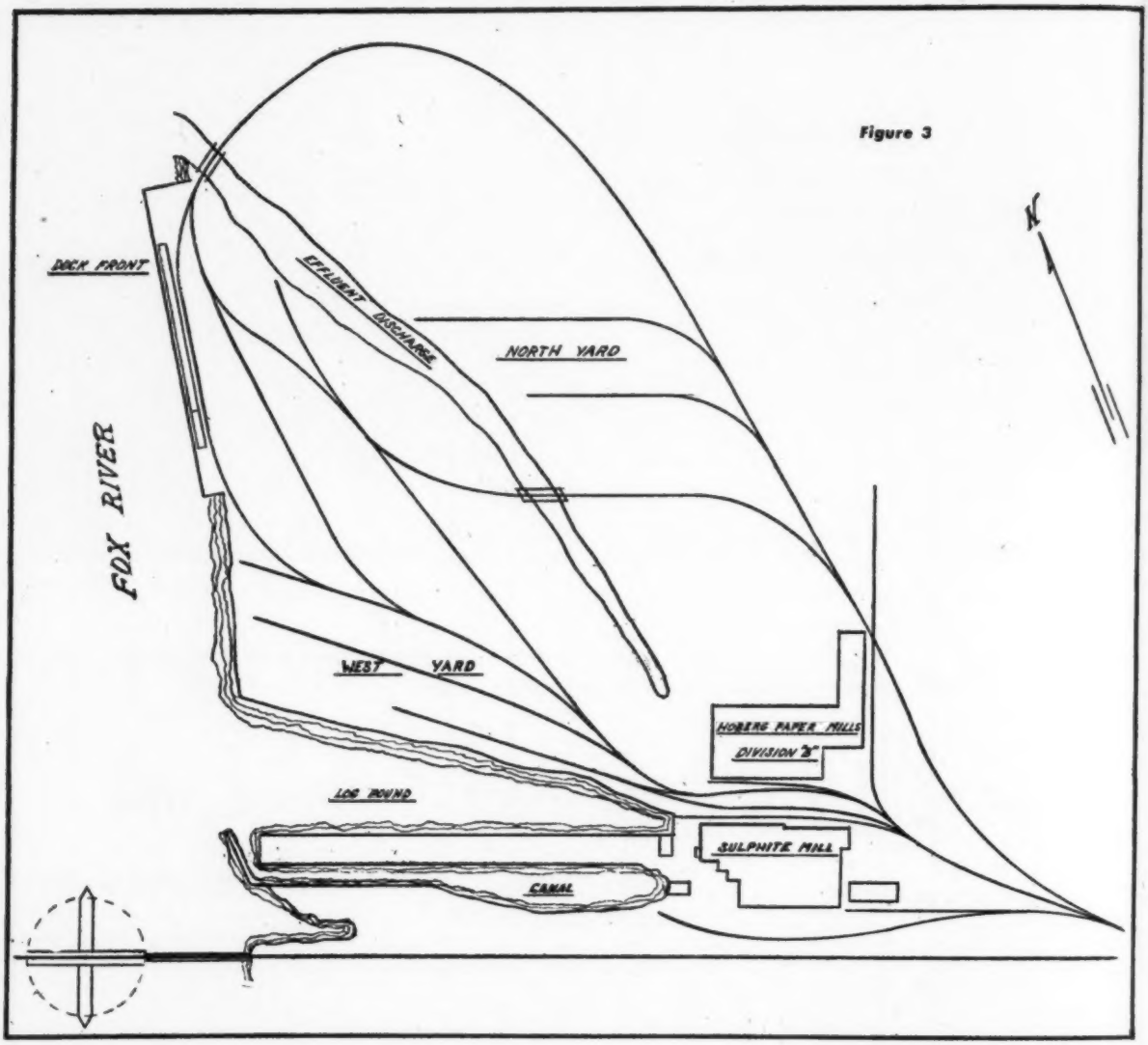


Figure 3

mediate use is boomed in the opposite direction to the other side of the barge into the water.

In 1946, a Northwest Model 8 and a P&H No. 855-B performed all of the unloading operations on the trestle. Both cranes were equipped with pulpwood grapples capable of holding one cord of eight-foot wood. The trestle approach is built as a ramp, enabling the cranes to reach the elevation under their own power. Steel guard rails run the entire length of the dock on both sides to prevent the cranes from running off.

Unloading of pulpwood barges requires 24 hours a day. To permit efficient night operation, the area is illuminated with 16 floodlights of 1,500 watts each. Four of these are long beams, and twelve are spread beams. They are supported from five poles lighting up the entire trestle and barge.

Four new cranes were purchased by the Hoberg Company in 1946. The two P&H, Model No. 855-B, two yard cranes, will be used on the trestle almost exclusively. The Northwest Model 8 Special Two Yard crane and a P&H Model No. 655-B, 1½ yard crane, will be used primarily for unloading the cars at the stock pile locations. A fifth crane, which is an older Model 6 Northwest 1½ yard crane, will be used extensively to service the pulp mill, unloading cars into the pond serving the wood room. Inbetween the arrival of boats, the two cranes operating on the trestle may be relocated into the yard to help empty the cars onto stock piles.

Storage facilities in the yard were enlarged to a considerable degree. This expansion of the yard was associated not only with the ease of handling pulpwood, but with due consideration to a reduction of the fire hazard. As a result, the yard was divided into two sections: a West Yard, and a North Yard, segregating softwoods from the hardwoods. The West Yard contains stocks of spruce and other softwoods, while the popple and hardwoods are contained in the North Yard (Figure 3). This segregation is another factor in obtaining lower fire insurance rates. Railroad track was installed in a wide circular arrangement surrounding the yards, and adjacent to the dock. Thus, as each car is filled, it is easily pulled to a strategic unloading point. Similarly, the continuous circle allows the empty cars to be returned to the dock for another load.

While the method of piling wood is a controversial subject, local conditions are apt to govern the choice of method. At Hoberg Paper Mills, tier piling is done. Although its disadvantage consists of requiring more

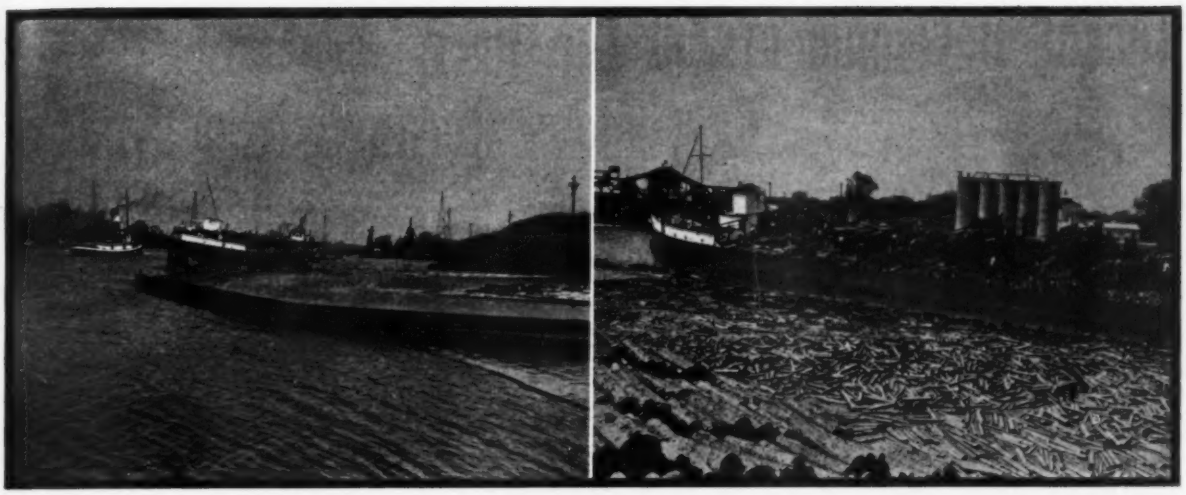


Fig. 4 (left)—Unloading by hand. Scows and dredge in background are just beginning operations preparatory to building new dock . . . Fig. 5 (right)—Old method of unloading decks by hand. Logs thrown into water and hauled out with scows and jackladders

time to pile properly and the necessity of more ground area other advantages were found to outweigh such difficulties. Because of the type of operations and arrangement of properties, it was found easier to reclaim wood from piles stacked in tiers. Also, this method permitted adequate rotation of wood; the logs are properly aerated, insuring seasoned wood for better pulp mill operation.

Switching of cars from the trestle to the yard is accomplished entirely with an I-9 International Wheel Tractor. This operation is performed by pulling the loads with a chain. Now being put into use is another type of International Tractor, a TD-9, Crawler Type. Three tractors will be in use this summer, the other being an older model Allis-Chalmers Wheel Tractor.

Augmenting the twelve company-owned flat cars, another twenty-five cars are leased from the railroad company during the navigation season. Both gondolas and flat cars are used. The cars owned by the company have been reconstructed with racks on each end and are of the flat car type.

Prior to the installation of the trestle, unloading of barges required crews of about fifty men, who removed only the deckloads in fifteen to twenty hours. By comparison, the new dock facilities permit unloading a deckload in about seven hours, with a crew of eight men and two cranes. The time element is reduced by more than one-half. In 1946, the figures tabulated for the season's work showed that four-foot wood could be removed from the deck and into the pond at the rate of 76 cords per hour. The eight-foot bolts, unloaded from the decks into the pond, were handled at the rate of 115 cords per hour.

Loading the deckwood into cars required more time, but the figures still proved the efficiency of this type of unloading. Loading of four-foot wood into cars from the decks was handled at the rate of 29 cords per hour, while the eight-foot wood from the decks could be unloaded at the rate of 63 cords per hour. The wood in the holds was unloaded at the rate of 27 cords per hour for four-foot and 34 cords per hour for the eight-foot logs. Deckloads of the average barges contained approximately 750 cords, while the hold contained 1,400 cords. This average of 2,150 cords per boat was exceeded at times when seasonal conditions permitted, the barges frequently carrying as much as 2,400 cords.

Fig. 6 (left)—New dock in operation . . . Fig. 7 (right)—Closeup of dock unloading. Deckload has been removed. Cranes are unloading from hatches (Photo taken from top of wheel house.)

Recent Developments in the Dorr Continuous Recausticizing System

R. F. CLEMENS

▶▶▶ KRAFT PULP MILL operators appreciate the importance of the recausticizing step since it is here that the recovered soda chemicals are converted to a form suitable for reuse in the process. The chemistry of the recausticizing process is quite simple and is represented by the following reversible reaction $Na_2CO_3 + CaO + H_2O = 2\ NaOH + CaCO_3$. The process, however, as a whole, has many functions other than the primary one of converting the sodium carbonate to sodium hydroxide. The requirements of a complete recausticizing plant may be summarized as follows: It should convert as much of the sodium carbonate to sodium hydroxide as possible; produce a suitably clarified white liquor of the desired concentration; separate, wash, and dewater the lime mud to prepare it for calcination; clarify the green liquor prior to causticizing and wash the resulting dregs; and return the reburned lime for reuse.

The Dorr Company has pioneered in the development of continuous processing methods in the recausticizing flowsheet covering the basic unit operations of slaking, agitation, sedimentation and filtration. This work has resulted in the development of the continuous recausticizing process and its wide acceptance in the kraft pulp industry.

It is the object of this article to describe the modern continuous recausticizing process with particular reference to new developments, which are being incorporated in the new plants now being constructed and in existing plants which are being expanded. The flowsheet (Figure 1) indicates the equipment units and a process quantity balance of soda and liquors.

The process (referring to the flowsheet) may be described by selecting the hot lime as it is discharged from the kiln as the starting point.

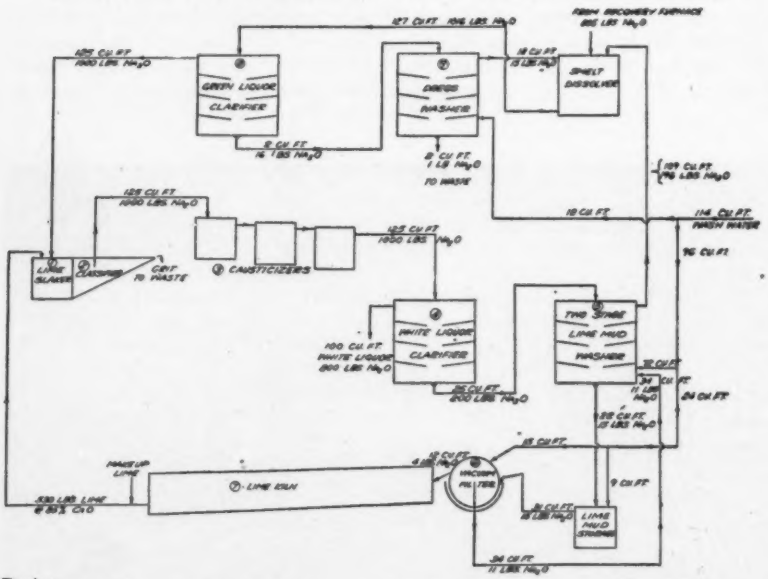
Hot lime is conveyed by means of a drag conveyor and bucket elevator to the reburned lime storage bin. Also included is a new lime storage bin from which the required make-up lime is blended with the reburned lime and added to the lime slaker. With some kiln installations a limestone bin is provided and the necessary lime make-up requirements are supplied in the form of limestone. Should this be the case, then the new lime bin would only be used during an emergency period when the kiln was down. This lime handling equipment is not shown on the flowsheet.

The lime from the reburned lime bin is fed continuously by means of a screw conveyor to a combination lime slaker-classifier (Item No. 1). The rate of lime addition is controlled by means of a chain type variable speed feeder. In plants where new lime is used as make-up it is fed continuously with the returned lime to the screw conveyor which feeds the slaker. In the slaker the lime is slaked with clarified green liquor from the green liquor clarifier and the causticizing reaction is started. The combination lime slaker-classifier consists of a slaking tank with agitator into which is built a standard reciprocating rake classifier section. There is an opening connecting the slaking and classification sections so these two operations are combined in a single unit with a common hydraulic level. After the lime is reacted with the green liquor in the slaking tank with the required agitation, the resulting partially causticized slurry enters the classifier section where relatively quiescent conditions are maintained and the coarse inert grit settles out and is continuously raked from the unit by the classifier rake mechanism which delivers it in a well washed and well drained condition. It is important that such grit be removed from the system at this point to prevent plugging and operating difficulties in the subsequent agitation and thickening process steps. Also if this grit is not efficiently removed, it will accumulate in the circuit and require periodic purging of the lime in the system.

The Dorrco combination slaker was developed about eight years ago as an improvement over the rotary drum slaker and separate classifier arrangement, which in the past was accepted as standard for the slaking and classification steps. The new combination unit has been developed until it is now generally accepted as an efficient method of carrying out the slaking and classification operations. The success of this machine followed the de-

Fig. 1—Kraft Recausticizing Plant—Process Quality Flowsheet

(All quantities are expressed as cubic feet or pounds per ton of air-dry pulp)



Basis:
100 cu. ft. white liquor per ton pulp
8.0 lb. total alkali as Na_2O per cu. ft.
7.0 lb. active alkali as Na_2O per cu. ft.
30 per cent sulphidity
White liquor clarifier underflow 33 per cent solids
Lime mud washer underflow 40 per cent solids
Filter cake 55 per cent solids
900 lb. of lime mud (dry) per ton of pulp handled in steps of 1 to 6 inclusive
15 lb. of dregs per ton of pulp handled in steps 8 and 9
Soda reported is total soda as Na_2O
Volumes reported are liquor volumes without suspended solids

velopment of a very rugged design to withstand the severe service conditions encountered in a recausticizing plant. The slaking tank is lined on the sides and bottom with 1 inch thick replaceable white iron liners. The agitator and the classifier mechanism are of stainless steel construction.

Compared to the old rotary drum separate classifier arrangement, the combination slaker presents a much neater and efficient operating installation. This unit can be ventilated very easily by means of a vertical vent stack attached to the slaker cover, compared to the elaborate and only partially effective vent seals required to seal two ends of a revolving drum with the rotary slaker. Similarly, the feeding and discharge from the combination slaker is simplified. Also connecting troughs or pipes between the slaker and classifier are eliminated. The combination slaker is shipped almost completely assembled and requires a very simple foundation slab, compared to the relatively expensive erection and foundation requirements of the rotary slaker separate classifier arrangement.

From the slaker-classifier the partially causticized slurry passes through three causticizer tanks (Item No. 3) in series. These tanks provide sufficient detention time for the causticizing reaction to be completed. They are equipped with stainless steel agitators and are now usually brick or concrete lined.

From the causticizers the causticized slurry enters the white liquor clarifier (Item No. 4) where the calcum carbonate is settled and the clarified white liquor is overflowed for use in the digesters. The Dorr white liquor clarifier is usually a three-tray, four-compartment balanced type tray thickener, in which all the compartments are operated in parallel. The feed is divided four ways by means of a weir box and each fourth of the feed is fed to each thickener compartment. The overflow pipes from each compartment are set so that equal volume of overflow are withdrawn from each compartment. The settled sludge from each compartment passes down to the compartment below it by means of a deep central boot which causes the sludge from one compartment to be transferred into the settled sludge in the compartment below without any opportunity for the sludge to be reslurried and thus have to be unsettled. The deep central boot on each tray extends down into the sludge on the tray below. In this way, the mud from each tray passes down through these central boots to the bottom compartment and a seal on each tray is produced which resists any tendency for liquor short-circuiting between compartments. Finally, the sludge is pumped from the bottom compartment by means of a single pump.

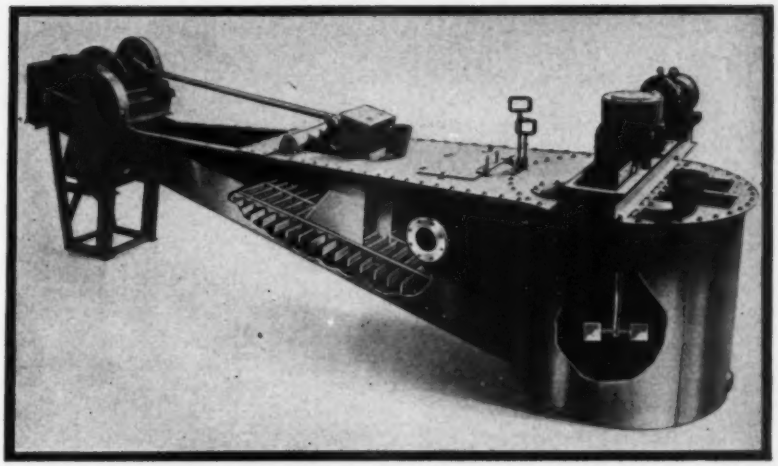


Fig. 2—Phantom view of Dorrco Slaker, showing details of rotating slaker mechanism and reciprocating rakes, which remove, drain, and discharge grit, sand and unburned core

The above operating features of the balanced tray thickener result in an area utilization of close to 100 per cent. In other words, a four-compartment balanced tray thickener has essentially the same clarification efficiency as four separate individual thickeners of the same diameter. The operation of this thickener is simple, since few adjustments should be made after the overflow pipe levels are set at the time the equipment is installed. All the sludge is removed from the unit by means of one pump, which also greatly simplifies the operation of the unit. The balanced tray thickener has found wide and successful application in causticizing plants. It is a well proven machine which has been developed over the years under actual service conditions.

This thickener is made of extra heavy plate construction to withstand the corrosive action of white liquor. In the newer plants stainless steel feed and overflow boxes are specified since the corrosion at these points is usually severe due to the unavoidable aeration which takes place. Also on the more recent units a motorized thickener lifting device is used which permits the thickener mechanism to be raised, should an overload condition occur, by merely operating a push button. In the same way the mechanism can be gradually lowered to work out the overload. An overload in a recausticizing plant thickener is not very common, but it is advantageous to have a simple way to work out of it when it does occur.

The settled lime mud from the white liquor clarifier, containing 33 per cent to 40 per cent solids, is pumped to the lime mud thickener-washer (Item No. 5), where the lime mud is given two stages of washing prior to filtration. In the past, it was standard practice to make the lime mud thickener identical in size and design as the white liquor clarifier and give the mud just one stage of dilution washing. Actually, the settling area required for a single stage of lime mud washing is only about half that required for white liquor clarification but these units were made identical so that during an emergency period, when the white liquor clarifier was down, the lime mud thickener could be used as a white liquor clarifier. Therefore, the lime mud thickener is usually about 100 per cent oversize on most installations in the past using a single stage of lime mud washing.

In order to utilize more efficiently the area in the lime mud thickener, the Dorr Company has developed a design whereby a unit having the same area as the white liquor clarifier gives the lime mud two stages of counter-current decantation washing instead of one, and during emergency periods it can be swung over to operate as a white liquor clarifier. This is accomplished by operating the top two thickener compartments in parallel and the bottom two in parallel, and both these sets in series with each other. Thus, the first stage of washing is carried out in the top two compartments and the second stage in the bottom two. When it is desired to operate this unit as a white liquor clarifier, a simple adjustment in the feed box permits all four compartments to be operated in parallel as required to obtain the necessary settling area for white liquor clarification.

The only additional cost to obtain this two-stage washer design is for a diaphragm pump to remove the mud from the top two compartments and deliver it to the bottom two compartments, and a centrifugal pump to pump the overflow liquor from the bottom two compartments. The overflow liquor from the top two compartments goes to weak liquor storage. Fresh wash water is added to the underflow from the top two compartments entering the bottom two compartments.

The additional stage of lime mud washing obtained with the Dorr Company two stage lime mud washing thickener followed by vacuum filtration, will result in the soda content of the lime mud entering the kiln from the filters being reduced to about 25 per cent of what it was with the old scheme of one stage of dilution washing followed by filtration. Thus the soda content of the lime mud going to the kiln is easily maintained at about .5 per cent soda as Na_2O, as compared with figures between 1.0 and 2.0 per cent in former installations. This large reduction in soda in the lime mud will result in improved filter performance from an operating and maintenance point of view and improved life of kiln lining together with a probable reduction in any tendency for ring formation in the kiln. Also, should the filters be down for any reason, the lime mud from the two-stage washer is sufficiently well washed to be fed directly to the kiln during an emergency. Thus a spare filter is not an absolute necessity.

It should be obvious from the above that the two-stage lime mud washer involves just a relatively small additional investment for extra pumps and results in very important advantages which will result in very sizeable maintenance and operating savings. This two-stage unit has been demonstrated in plant operation and is included as a standard recommendation on practically all Dorr Company recausticizing plant projects.

The green liquor from the smelt dissolvers is clarified in a four-compartment balanced tray thickener (Item No. 8) which is practically identical to the white liquor clarifier. The clarified green liquor overflow from this unit flows directly to the lime slaker, where the causticizing reaction is started as described above. It is important that the green liquor be clarified in order to remove the dregs, consisting of inert carbon, iron salts, etc., from the recovery furnace which would be trapped with the lime mud and would build up in the lime circuit.

The settled dregs from the green liquor clarifier contain considerable soda in solution with the entrained liquor. This soda is recovered by washing the dregs in a four-compartment Dorr washing thickener (Item No. 9) where the dregs are given four stages of counter-current decantation washing. This thickener is arranged with the four compartments in series so that the settled dregs are subjected to four successive settlings, being diluted prior to each settling with overflow liquor from the next settling in the series. The first settling stage is carried out in the top compartment and the settled dregs work down through the unit, while the wash water works up through the unit. The underflow from the bottom compartment is pumped from the unit and is discarded containing a negligible amount of soda. The only pump required is to remove the washed dregs from the bottom compartment since the wash water is processed up through the unit by utilizing the effect of the greater superelevation of overflows from successively lower compartments. The dregs move down through the unit by passing through hydraulic seals in each tray. The wash water is added to the bottom compartment and the liquor overflowing the top compartment goes to weak liquor storage.

In the plants being installed today, the underflows from the various thickeners are pumped in Dorrco duplex VM suction pumps which have the feature of permitting the stroke of the pump and, therefore, the capacity to be varied while the pump is in operation. This is an important feature since the successful operation of a thickener depends on the removal of the underflow mud at the correct solids concentration. In the old style pumps in order to vary the capacity to correct for an incorrect underflow mud density it was necessary for the operator to shut the pump down, change a cam setting to vary the stroke and then start the pump up again. This was a nuisance and required the operator's having tools, all of which resulted in a tendency on the operator's part to neglect this important control. Dorrco pumps are now equipped with stainless steel valve seats and retainers when used on the white liquor clarifier due to the corrosive action of the white liquor.

The white liquor clarifier and lime

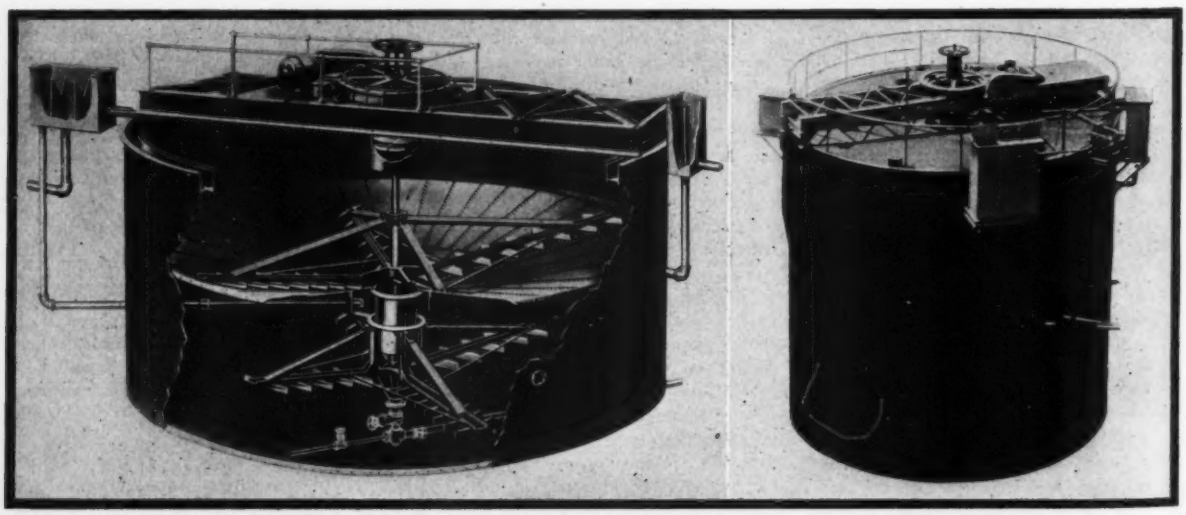


Fig. 3 (left)—Phantom view of two-compartment Dorr balanced tray thickener showing mechanical details. This type is used for the clarification of green liquor and for the clarification of white liquor . . . Fig. 4 (right)—Dorr washing type tray thickener as used for washing green liquor dregs and precipitated lime mud

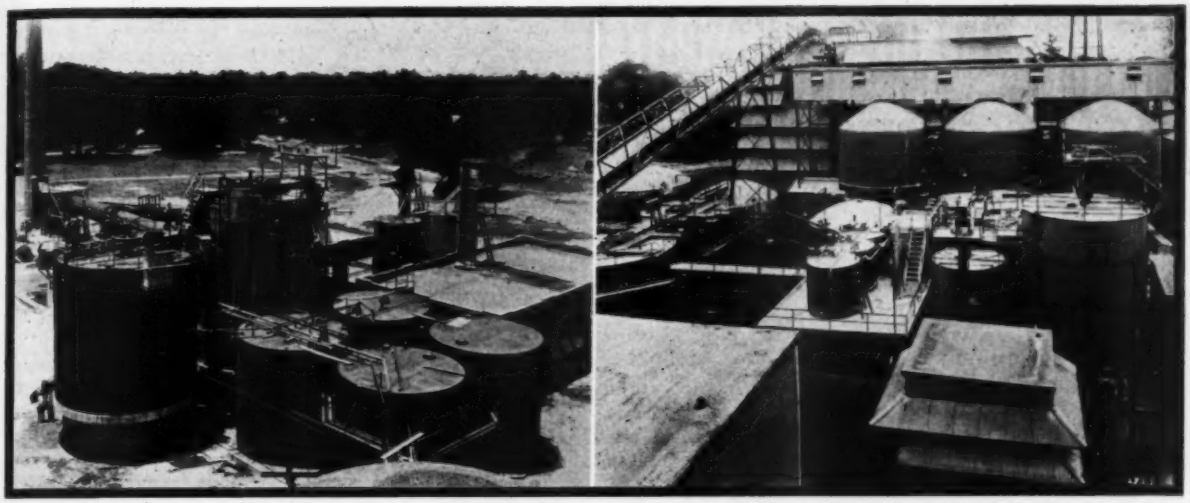


Fig. 5 (left)—Dorr Recausticizing System for a 150-ton per day kraft pulp mill (St. Mary's Kraft Corporation, St. Mary's, Ga.). The two Dorr Tray Thickeners in the middle foreground are of the combination washing type; one at left, clarifying green liquor and washing dregs therefrom; one at right, clarifying white liquor and washing precipitated lime mud. In right foreground, four liquor storage tanks; directly behind building containing Dorrco Slaker and Dorr Causticizing Agitators. In right foreground, lime bins; in left background, rotary lime reburning kiln . . . Fig. 6 (right)—Dorr Recausticizing System for a 224-ton per day kraft pulp mill (Hollingsworth & Whitney company, Mobile, Ala.). Lime bins are shown at the right with the Dorr Green Liquor Clarifier and Dorr Dregs Washer just behind them. Three Dorr Causticizing Agitators are on elevated platform in center. Dorr White Liquor Clarifier and Dorr Lime Mud Washer are at the extreme left. A small section of the lime kiln may be seen in the lower foreground. Dorrco Slaker, not shown, is located directly below the Dorr Causticizing Agitators

mud thickener are provided with Torq recorders which give a continuous record of the load on the thickener which is a valuable guide to the operator and gives a record of the thickener's performance during the night shifts which is valuable information for the supervisory staff. This feature is new and is finding wide application in recausticizing plants.

As on other process work control instruments are finding greater application today than ever before. Most of the modern installations include the following instruments in addition to the Torq recorders referred to above; raw green liquor flow recorder-controller, green liquor temperature recorder-controller, temperature recorder to first causticizer, wash water flow recorder-controller, white liquor flow recorder and storage tank level indicators. The instruments are easily justified on the basis of improved operating efficiency.

While the above description covers the conventional recausticizing plant, there are many instances when for special reasons the recommended plant deviates somewhat from the above. It would be impractical to discuss all the possible variations, but we should point out one fairly common design which is used in relatively small plants where it is sometimes felt that vacuum filtration prior to lime reburning can not be justified.

With four stages of washing the lime mud is washed well enough to be fed directly into the lime kiln. The moisture content of the kiln feed will, of course, be higher than with the use of a filter, but in modern plants of this type a unit thickener is used before the kiln in place of a lime mud slurry storage tank to deliver a lime mud with a minimum of moisture by sedimentation means. It should be possible to maintain the moisture in the kiln feed at about 45 per cent solids.

In these plants the lime mud is given four stages of counter-current decantation washing in a washing thickener similar to the dregs washer described above where all the compartments are arranged in series. This washing is frequently combined with the white liquor clarification operation and both of these steps are carried out in a single tray thickener. This so-called combination tray thickener is usually a six-compartment unit where the top two compartments are arranged in parallel and are used for white liquor clarification while the lower four compartments are arranged in series and are used for the counter-current decantation washing of the lime mud. The lime mud from the white liquor clarification step in the top two compartments is pumped from the unit and re-introduced into the washing section. With this type of plant sometimes the green liquor clarification and dregs washing steps are carried out in a similar combination machine.

While the above described recausticizing plant contains many improvements over what has been offered in the past, the need for continued research and development work in this field is realized, and it is hoped that in the years to come there will be further advances to report.

Making a Research and Development Program Work

WARREN CHILSON
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Northern Paper Mills

▶▶▶ TWO ACTIVITIES IN the pulp and paper industry—Research and Development—are being considered more and more as two widely different functions. In recent years, development has taken on a newer and broader meaning. Today, it covers a field which heretofore functioned to a limited extent under research, and, to a much greater extent, under production.

Research entails critical and exhaustive investigation and/or experimentation in an attempt to discover new facts. Therefore, research is considered fundamental. Development is the growth of an idea or fact from the fundamental laboratory stage to the full-scale commercial application.

Many attempts have been made to conduct pulp and paper research and development with a highly-trained, theoretical staff under the direction of a highly-trained, theoretical department head. This system has met with a degree of success in some organizations, but in most cases it has failed. Industrial management has learned that the combined functioning of such a staff does not produce the desired results. Other methods of organization, therefore, have been sought to bring about more rapid progress in the creation of new and better products and in the reduction of costs.

One of the most vital problems, as well as one of the most interesting activities confronting paper-mill management today is the setting up of a department or departments to carry on experimental work of the pulp and paper mill organization.

The reason for the failure of many combined research and development departments, staffed with research workers, is quite obvious. Men who are best equipped and fitted for pure research are not always suited to development work. Pure fundamental research requires specialists who are highly trained in theory. Development on the other hand requires individuals with a background of practical experience and an understanding of the value of a research accomplishment.

In the past, fundamental research in the pulp and paper industry has been conducted by highly trained chemists; development, by production men with a desire to improve upon operations which appeared to be satisfactory and successful. Today, by and large, the research men of the pulp and paper industry are chemists, physicists, and biologists; the development men, chemical engineers and mechanical engineers.

Because of the possibility of a greater return from investment, emphasis seems to be shifting today in some mills from research to development. Some industrialists feel that research has progressed faster than development and that development should be given a chance to catch up. The author does not subscribe to the theory that fundamental research should be stopped, but he does believe that there are many fundamental facts which have not been applied commercially in the paper industry.

Many executives hesitate when it comes to development operations. This hesitancy is due to the tremendous risks involved if pilot plant equipment is not available and to the high costs in setting up pilot plant operations if they are required. In the laboratory or the pilot plant, a slight miscalculation or error in design which could prevent the successful conclusion of an experiment might involve loss of chemical, possibly some equipment, and time of the worker. In the full scale application of a new principle, however, an error might cause not only the loss of chemical, equipment, and the time of the worker, but also the loss of production and the time of a number of workers depending upon the nature of the development and the machinery involved.

In development, the potential savings and improvements are great. At the same time, so great are the probabilities of losses that a very critical attitude must be taken if the development contemplates a major replacement of equipment.

Many executives avoid the high risks involved by development operations by limiting experimental work to that of product or process involving relatively low cost equipment, or equipment which can be set up as a full-scale unit apart from a production line. Many developments of this nature in paper converting have been conducted by machinery manufacturers in their own establishments and not in the pulp and paper mills. Production is not involved until a unit is placed in commercial operation. Then some minor changes in design may have to be made before it can be operated successfully over long periods of time as a production unit.

The selection of personnel for research work and for development work is a task which should not be taken lightly. For best results, individuals having one set of qualifications should be selected for research work and individuals having other qualifications for development work. In the pulp and paper industry this procedure is particularly essential.

Many executives realize the importance of including practical-minded men in experimental departments. They are learning that the possibilities of a well-organized development department are tremendous, but that extreme care must be taken in the choice of personnel.

Situations which require the services of competent development personnel confront many executives. For instance, an executive, known personally to the author, agreed to finance the commercialization of a discovery made by a chemist because he felt that it had economic possibilities. The chemist had invented a process based on the introduction of air into a suspension of fibers in a beaker to produce a smooth, lightweight mass. He had found that by means of a vertical stirrer he could create a vortex through which air would be drawn and that this vortex would become smaller as the volume expanded and that it would disappear when a definite expansion had taken place. He also found that this expanded material could be dried in an oven to produce an unusually lightweight fibrous material.

The chemist was given the task of designing and building a semicommercial mixing unit to produce this bulky fibrous material continuously. In this design he incorporated his original principle of vortex creation and a unit

containing a multiplicity of revolving stirrers was built. The stirrers, driven by V-belts, were arranged in several rows.

In operating this unit, the material was introduced into one end of a long pan. As it passed from one row of stirrers to the next, air introduced by the vortexes increased its volume.

The final machine contained 73 stirrer shafts. Each shaft rotated in two antifriction bearings. To drive these shafts required 84 V-belts. Many of the V-belts were used in single belt drives.

This unit was declared impractical by the executive soon after it was placed in operation. Then he decided to locate a man with practical experience to improve its operation. He found a chemical engineer of a wide experience and immediately gave him the responsibility of developing the process and equipment. In a short time a new practical approach to the mixing problem was presented.

The engineer developed a special tube with a number of mixing devices on one rotating shaft within the tube. At the bottom he located an inlet both for the suspension and for air, and both of which he measured. Thus with one tube, one shaft, six agitators, and three bearings, the mixing job was done better than in the previous equipment. Furthermore, the mixing action was completely under control at all times.

Not all equipment can be simplified to the extent of the case cited, yet the number of items which can be simplified is surprisingly great.

Without either the research chemist or the development man the process covered by the example could not exist in its more practical form. Without the contribution of the research worker there would have been no process. Without the contribution of the development man, the process would have been dropped as being impractical.

There are many other examples to illustrate the value of both research workers and development workers in the paper industry. There are also many examples of failures of research men to apply their findings to commercial equipment. Attempts by research men without wide practical experience to make changes in papermaking equipment have resulted in making the average research man unwelcome in some paper machine rooms. Consequently, almost all of the outstanding paper machine developments have been made by practical men with operating experience.

There are many ideas shelved in research laboratories because management has failed to realize the need for individuals who can convert them into practical and commercial form. The research worker cannot be held responsible for the fact that the fruits of his efforts remain idle and unused. He cannot be expected to translate his work into commercial practice or to take the work of others and develop it on a commercial scale.

Research men introduced the sheet mold for making quality paper by hand and have been using it for the manufacture of test sheets. In the operation of the device, a pressure differential is created which forms a sheet on a wire from a dilute suspension of fibers.

The sheet mold without any improvements in design has served for many years as one of the highly necessary tools of the research worker.

The principle involved in the operation of the sheet mold remained a laboratory item until a production man, discontented with existing conditions, decided to apply the principle to paper machines. As a result, many lightweight papers are made today on machines in which the sheet is formed by applying pressure to a dilute suspension of fibers upon a wire. The application of this principle has enabled lightweight-paper manufacturers to produce remarkably uniform papers at speeds in excess of machines with conventional forming sections.

The proper selection of personnel for experimental work cannot be over emphasized. Such a department will bring about growth in the company in proportion to the desire on the part of every individual on the staff to grow and to the extent that these members are permitted to grow.

So much depends upon the initative and enthusiasm of the individual worker. For that reason, the organization should be set up with the thought of directing and controlling this initiative and enthusiasm into channels which will bring the greatest return to the company.

The working conditions of each staff member must be such that his thoughts will not be detracted from his work. His associates must be chosen to provide a smooth working team. In addition, incentive should be provided so that each worker will know that he can grow in value to the company and that his contributions will be recognized.

Qualifications of a research worker are quite different from those of the development worker. The research worker should have a college education, and possibly some postgraduate work. He must be somewhat of a specialist in his chosen profession. In many cases, he will not be required to work with others. He is usually assigned an individual problem. He need not be familiar with the practical solution to his problem but only to its solution on a laboratory scale.

The development worker does not need to be college trained. An engineering education, however, is highly desirable. He must have a broad knowledge of commercial requirements of the business. Operating knowledge of the various pieces of machinery and equipment used in the manufacture of the company's products is another prerequisite. He must work closely with the operating staff. He must be able to talk with the operators in terms which they can understand. To a great extent, his success depends on his ability to use common sense and to put across his ideas to the machine operators. In a sense he must be both a diplomat and a salesman.

A research worker does not require the experience and background of a development worker. The research worker can go directly from school into the laboratory and produce results. The development worker must go from school into the plant or mill to gather operating experience before he is qualified to carry on development work. The research worker can be relatively young; while ordinarily the development worker should be older.

The development worker must have vision. He must be discontented with mill operations as they are. He must be on the alert at all times and must use his fundamental knowledge to improve operating methods and to produce new and improved products.

It has been said that a company which does not engage in research will fail. This statement is misleading because a company can conduct research and still fail. It is the *application of research* to commercial operations, rather than the fact that the company *conducts research* which is important.

A company need not do research to survive but it must be organized to effectively use the results of research if it is to continue to exist. Both research and development are necessary for progress. Neither one can be continued without the other. More research accomplishments must be carried to successful, practical conclusions.

It is more difficult and more expensive to get a product into successful production and sale than it is to make the product on a small scale. However, the effort is well worthwhile and the dividends are paid only when the product is produced and sold at a profit. Research and development are truly keystones of industrial progress.

Paper SKETCHES . . . . . .

John Tate ENGLAND'S FIRST PAPER-MAKER, WAS THE SON OF JOHN TATE, LORD MAYOR OF LONDON IN 1473.

THE PRICE OF WALLPAPER IN ENGLAND IN THE 1690's WAS 3 PENCE A YARD.

The ROMAN EMPEROR CLAUDIUS INCREASED THE WIDTH OF THE BEST PAPYRUS TO 11½ INCHES. BEFORE HIS TIME THE WIDEST SHEET WAS 9½ INCHES.

THE UNITED STATES PRODUCTION OF PAPER AND PAPERBOARD FOR THE FIRST THREE MONTHS OF 1947 AMOUNTED TO 5,176,832 TONS—A QUANTITY GREATER THAN THE PAPER MILLS OF ANY OTHER COUNTRY HAVE PRODUCED AS YET IN A FULL YEAR.

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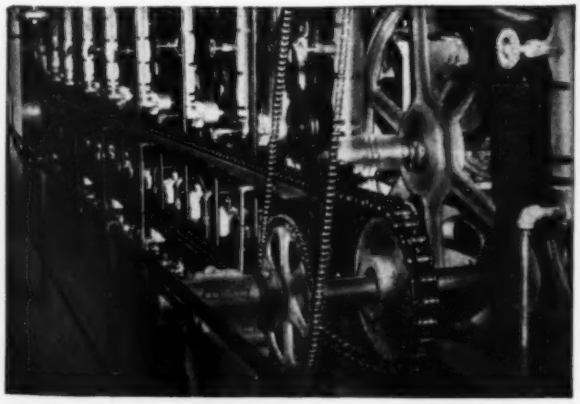
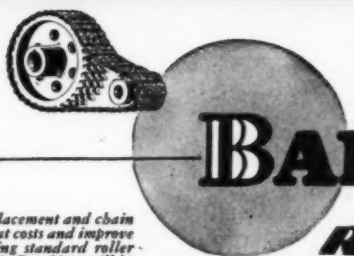
② **I'M NOT JUST TALKING** on that long-life angle. In our product development laboratories, we actually prove the wear-resistant qualities of Baldwin-Rex. This machine, for example, runs the chain over small sprockets at excessively high speeds under conditions considerably more severe than actually encountered to determine life expectancy. In this manner, we get data on materials, heat-treatment, parts design, etc., that mean added service for you.



③ **THIS MILL** found the long life and high strength of Baldwin-Rex Roller Chain a big help in paper production. This drive, for example, operating over 22-foot centers, turns the huge dryer rolls. Loads are heavy, but the husky Baldwin-Rex chain keeps them turning without pause . . . economically.



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ASSOCIATIONS

MICHIGAN SUPERINTENDENTS HOLD ANNUAL COATING CONF.

A large attendance—144 paper mill managers, superintendents and technical men—attended the annual coating conference of the Michigan Division of The American Pulp and Paper Mill Superintendents Association, held at the Park-American Hotel, April 17.

The speaker of the evening was John F. Halladay, industrial process consultant, Elkhart, Indiana. All phases of coating in the paper and board industry were covered by Mr. Halladay. Slides were shown giving a graphic presentation of the various coating processes.

A panel discussion followed Mr. Halladay's talk with O. W. Callighan as moderator. The experts chosen to participate in the panel were: Peter J. Massey, manager of Bryant Division, St. Regis Paper Company; James R. Simpson, development engineer of the Champion Paper and Fibre Corporation; Lester Smith, St. Regis Paper Company; A. P. Gardner, coating mill superintendent, Crown Zellerbach Corporation (West Linn, Ore.); R. H. Kelly, manager, Marathon Corporation (Rothschild, Wis.); and Gilbert Dickerman, technical director, Consolidated Water Power and Paper Company (Wisconsin Rapids, Wis.).

Walter Wolfe, MacSimBar Paper Company, was presiding chairman at the meeting.

◆

BARK REMOVAL WAS SUBJECT DISCUSSED AT MEETING OF WEST. N. Y. TAPPI GROUP

The Western New York Group of the Empire State Section of TAPPI, held it monthly meeting April 9 at the Prospect House, Niagara Falls, New York.

The subject of wood saving throughout the industry was discussed, and the part being played by the Allis Chalmers Streambarker, Defiberizer and Inter-plane Grinder was presented.

Stanley Leaf, of Allis Chalmers Manufacturing Company, explained the principles of the streambarker now being generally used commercially for removing bark from pulp and saw logs hydraulically, by means of three eliptical water jets, so designed as to derive maximum velocity pressure with adequate coverage at the point of impact at average log diameter. He explained that three jets delivering 200 gpm per jet at 650 lb. pressure had been found to give greatest barking capacity at minimum power requirement for run-of-the-mill wood; that pressure requirement could be varied to suit wood species, size, or winter and summer condition, between 400 lb. minimum and 1,350 lb. maximum. The Streambarker, he said, can be justified in operation by reduction of wood losses, greatly improved cleanliness of pulp produced from streambarked wood, elimination of costly hand cleaning, rossing, etc., with consequent manpower saving and reduced capital investment.

The streambarker is not adaptable to all barking operations, but its economics can be predicted.

R. E. Ketten spoke on the part being played by the defiberizer and inter-plane grinder in reducing forest crop waste. The Allis Chalmers defiberizer has a capacity of 20 tons wood fiber per 24 hours, consuming 60 kw-hr. per ton of fiber when operating on spruce, balsam, poplar and cotton wood. Wood bolts, slabs, edgings,

Panel members, speaker of the evening and the general arrangements committee for the annual coating night of the Michigan Division of the Superintendents Association. Left to right—Front Row: A. T. Luey, American Coating Mills, Elkhart, Ind.; Raymond L. Barton, Michigan Paper Co., Plainwell, Mich.; Paul Bartholomew, Hawthorne Paper Co., Kalamazoo; Wm. S. Astle, Michigan Paper Co., Plainwell; Albert Perlick, Kalamazoo Vegetable Parchment Co.; and Walter Wolfe, MacSimBar Paper Co., Otsego, Mich. Back Row: O. W. Callighan, Edgar Brothers Co.; Arthur Cole, Rex Paper Co., Kalamazoo; Glen Sutton, Sutherland Paper Co., Kalamazoo; A. L. Sherwood, Sutherland Paper Co.; James R. Simpson, Champion Paper and Fibre Corp., Hamilton, Ohio; R. H. Kelly, Marathon Corporation, Rothschild, Wis.; Peter J. Massey, St. Regis Paper Co., Kalamazoo; and John F. Halladay, Elkhart, Ind., speaker of the evening

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MILL SUPPLIES
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PUBLIC WORKS
TRANSIT LINES
AIRCRAFT
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etc., are fed to a 2-section hopper which traverses over defiberizing heads. The wood is combed into fiber by the action of revolving needles in the head as the hopper passes to and fro. Wood moisture content of over 35 per cent is necessary to produce a product suitable for wall boards, asphalt shingles, insulating material, etc.

The inter-plane grinder, a high speed vertical attrition mill with one upper stationary and one lower rotating element, is designed to reduce all types of wood waste to wood flour or fiber, depending upon choice of plates, moisture content and plate clearance. The product is being utilized in production of roofing felts, core stock for veneer doors, plastic board, or as wood flour. The Allis Chalmers laboratory is maintained to determine suitable machinery and processes for any requirement.

◆

BRAWN, NATIONAL TAPPI PRES., AND ALLEN ABRAMS GUESTS OF CHICAGO GROUP

At the regular meeting of the Chicago Professional Paper Group on April 21, W. E. Brawn, national president of the Technical Association of the Pulp and Paper Industry spoke to the Group following the dinner. It was the Chicago Group's first official visit from a national president since it became a section of TAPPI.

On his first visit to the Group, Mr. Brawn was accompanied by Kenneth Geohegan, of Dayton, Ohio, chairman of the local section activities committee of TAPPI, and George J. Brabender, Rothschild, Wisconsin, TAPPI's official representative to the Chicago Professional Paper Group.

The main address of the evening was given by Dr. Allen Abrams, vice president in charge of research and development of the Marathon Corporation, Rothschild, Wisconsin. Mr. Abrams spoke on the subject "Research as a Business." His talk was broad in its scope and covered all phases of the research problem from the inception and planning stage to its operation and the fulfillment of its function. The speaker lived up to his already firmly established reputation as one of the best informed authorities in the industry and he kept his audience at the peak of attention and interest for about an hour, with his thorough mastery of all angles of research as applied to the industrial field together with a brilliant analysis of research and management problems.

The Chicago Professional Paper Group is hardly more than three years of age, but it has grown into an active society representing a cross section of many different professions and businesses, both technical and nontechnical, all of which are interested in certain phases of the manufacture, conversion, sale or use of paper or paper products.

Executive Committee of Chicago Professional Paper Group (1946-1947). Left to right: Seated—A. K. Roach, vice president; Warren Price, secretary; F. D. Long, president; C. Swett, treasurer; Archie G. Hepburn, vice chairman, arrangements committee . . . Standing—Harry E. Weston, ex-president; A. L. Magnuson, chairman, announcements committee; Edward C. Berg, vice chairman, program committee; George Alderson, publicity; Joe Kubicka, chairman, arrangements committee; G. O. Guth, chairman, program committee.

◆

NEW OFFICERS ELECTED BY NATIONAL PAPER TRADE ASS'N

At the forty-fourth annual convention of the National Paper Trade Association, held in New York the first part of April, the following officers were elected:

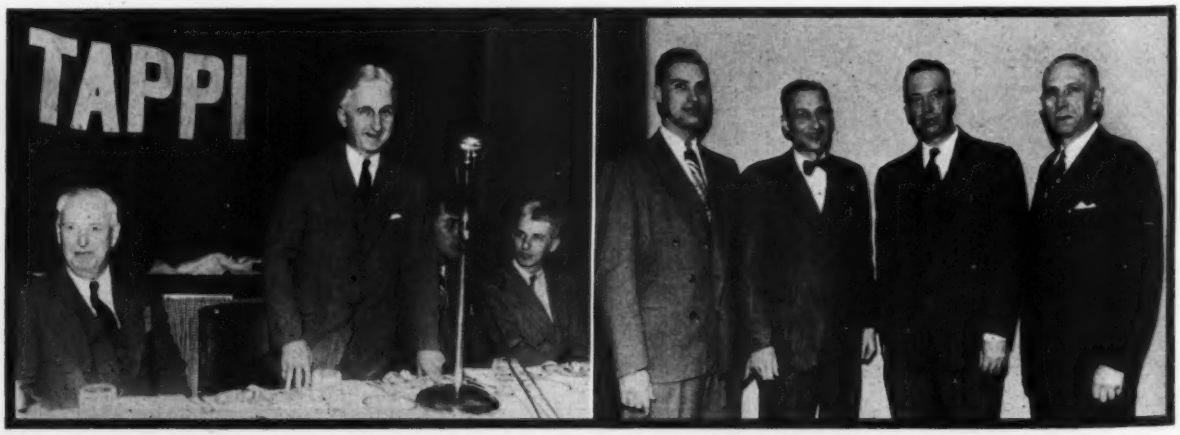
President—Arthur W. Towne, San Francisco

Vice President—Ralph G. Luff (Wrapping Paper Div.), Philadelphia

Vice President—L. A. Ramaker (Fine Paper Div.), Milwaukee.

Treasurer—J. O. Buckley, New York

The new executive committee includes: the newly elected officers; retiring president, G. E. Carpenter



LEFT—Allen Abrams, vice president in charge of research and development, Marathon Corporation, Rothschild, Wisconsin, who addressed the meeting of the Chicago Professional Paper Group on "Research as a Business" . . . RIGHT—A group of TAPPI notables. (L to R) F. D. Long, president, Chicago Professional Paper Group; George J. Brabender, Official TAPPI representative to the Chicago Professional Paper Group; Worthen Brawn, national president of TAPPI; Kenneth Geohegan, chairman of local section activities committee of TAPPI

They use PERMUTIT* *Water Treatment* for 2 different reasons!

1. *"We were wasting pulp fibre*—far more than was practical. A Permutit White Water Reclaimer was installed at the mill and this equipment certainly did the trick. Today we're not only recovering a high percentage of fibre and filler from our process water, but we even re-use the water!"

2. *"A water shortage sold me* on Permutit. It looked as though the mill would have to shut down, until one of our chemists suggested Permutit equipment for *water* recovery. Water shortage doesn't bother us now. We use the same water over and over now, without loss of efficiency."

WHERE DO YOU FIT IN? Which of these mill operators reminds you of — *you?* If your water problem is one or a combination of these, there is help for you here at Water Conditioning Headquarters.

Permutit invites you to take advantage of its knowledge of paper mill water, born of more than thirty years' experience in the field of water treatment. Write for information to The Permutit Company, Dept. PI-5, 330 West 42nd Street, New York 18, N. Y., or Permutit Co. of Canada, Ltd., Montreal.

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ONE OF THE WAYS in which Permutit helps the pulp and paper industry to control water quality is this White Water Reclaimer for the recovery of fibre and filler, permitting re-use of the water.

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WATER CONDITIONING HEADQUARTERS

(Omaha); S. T. Baron (New York), F. H. Blackman (Boston), R. W. Roehm (Detroit), and Robert Knox (Chicago).

Reuben Robertson, president of the American Paper and Pulp Association, highlighted the program of the convention with an address on the problems of the industry, saying he believes that it is to the advantage of the entire industry to accept a modest curtailment of use rather than a further expansion of production. He said that the paper producer, the merchant, and the consumer alike will be the gainers if the industry is built on the foundation of a maintained market, rather than on the sands of temporary surge.

◆

GAGE OF MERGENTHALER ADDRESSES THE KALAMAZOO VALLEY SECTION OF TAPPI

At a meeting of the Kalamazoo Valley Section of TAPPI held April 3 at the Columbia Hotel, Kalamazoo, Michigan, the speaker of the evening was Harry L. Gage, vice president of the Mergenthaler Linotype Company, Brooklyn.

The theme of the meeting, which was attended by more than 80 TAPPI members and guests, was the need for a better technical understanding of paper problems which find their way into graphic arts. Robert Mashburn, of Hercules Powder Company, was chairman.

In his remarks, Mr. Gage stressed the need for a better understanding between the paper industry and graphic arts. This, he pointed out, has come about through a lack of appreciation for the technical problems of the one group by the other group. He believed that a strong and lasting unity between the press and its source of supply is a verity that cannot be undervalued.

Leaders in the paper and graphic arts industries were introduced at the meeting and impromptu subjects were introduced. Fred Elliott, of Time Inc., displayed materials and equipment used in testing printing and printing materials, and Vance Vallandigham, of the Kelco Company, explained the smear text used by his company as an index of paper printability.

◆

STRAW PROTECTION TOPIC AT TAPPI COMM. MEETING HELD IN NW REGIONAL LAB.

A conference sponsored by the Fibrous Agricultural Residues Committee of TAPPI was held April 1 at the Northern Regional Research Laboratory, Peoria, Illinois.

The meeting was attended by fifteen representatives of chemical companies and strawboard manufacturers who discussed ways in which chemical molds may be used to protect piles of strawboard from weathering when stored out of doors. Dr. S. I. Aronovsky, in charge of the pulp and paper section of the laboratory and chairman of the conference, presided over the discussions.

Experiments with chemicals decided upon in the conference will be held next fall in the yards of midwestern strawboard manufacturers.

◆

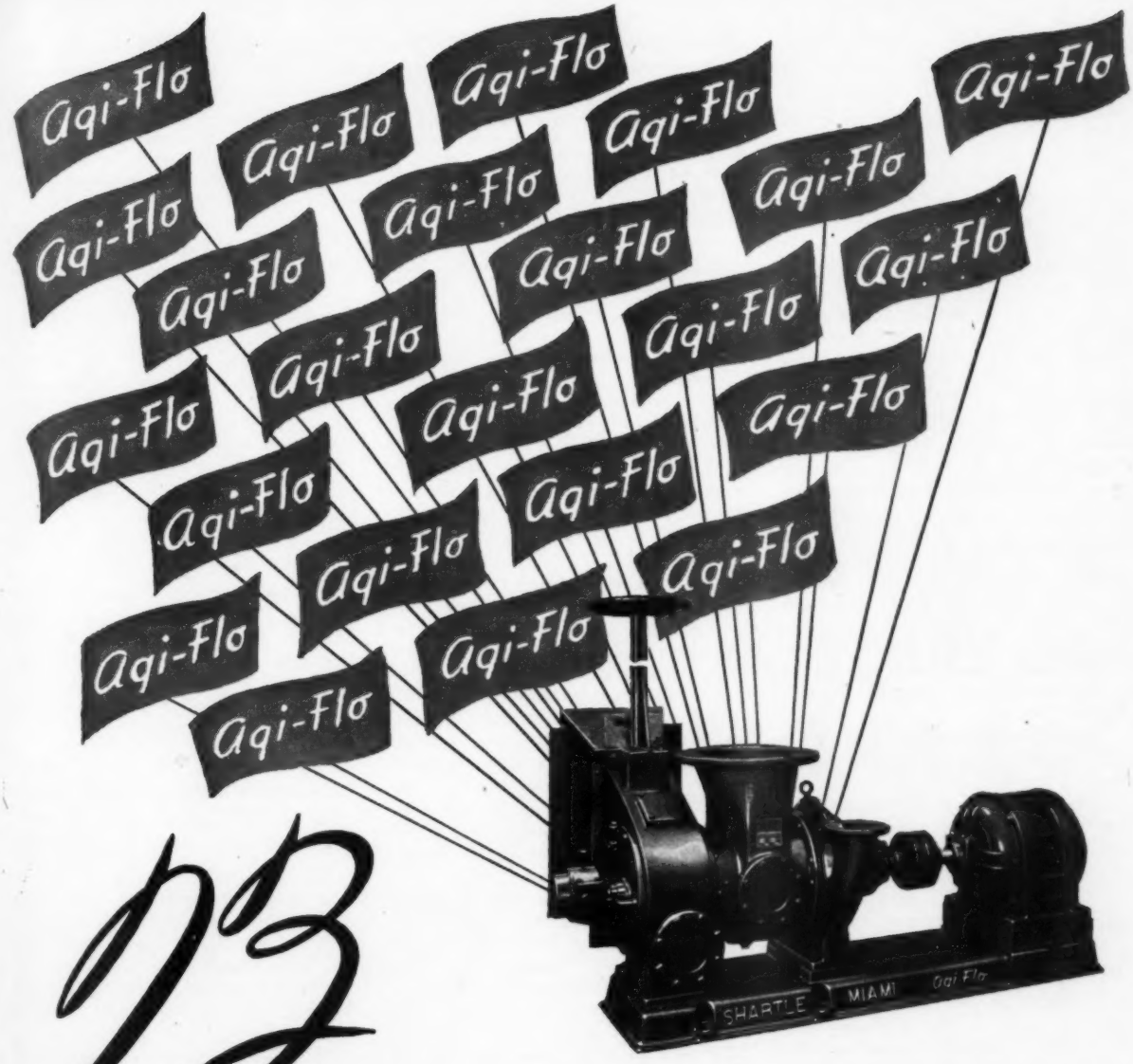
RECORD ATTENDANCE AT CONN. VALLEY DIV. OF SUPERINTENDENTS ASS'N

The regular meeting of the Connecticut Valley Division of the American Pulp and Paper Mill Superintendents Association, held in Holyoke (Mass.), April 12, recorded the largest attendance in the history of the association.

A special feature of the meeting was the presentation of past chairmen's certificates to the following: Howard Ferguson, John H. Browne, Matthew W. Horgan, A. B. C. Drew, L. E. Weiser, Stephen G. Stapley, W. Gordon Booth, M. O. Morris, and Ollie W. Messner.

Ray C. Winkler, who presided at the meeting, called attention to the excellent work of the new activities committee which had planned the program. Members of the committee are:

Guests at Kalamazoo TAPPI meeting. Standing (L to R)—Lee H. Mimms, program chairman; F. H. Stowitts, production manager, Michigan Carton Co., Battle Creek; Omar Cook, art director, Kellogg Company, Battle Creek; Paul F. McCue, buyer, Quaker Oats Company, Chicago; Walter Gage, president Gage Printing Co., Battle Creek (brother of speaker); and Harry W. Nolte, superintendent of Woodward and Firnan, St. Louis . . . Seated (L to R)—Myron Flotow, Allied Paper Mills, TAPPI treasurer; Frank French, president French Paper Co., Niles, Mich. toastmaster; Harry F. Gage, president Mergenthaler Linotype Co., Brooklyn, speaker of the evening; R. T. Mashburn, Hercules Powder Co., TAPPI chairman; Vance Vallandigham, Kelco Co., and Fred Elliot, Time Inc.



23

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Robert W. Pattison, American Writing Paper Corp., chairman; Frank Johnson and John H. Browne, of Chemical Paper Manufacturing Company.

Three speakers addressed the meeting. "Trends in Paper Machines," was the subject covered by G. A. Peterson, assistant sales manager of Rice Barton Corporation, Worcester, Massachusetts. The speaker said that "the trend is to design machines that will make more paper faster and at an economical price," but he added that "more and more attention is being given to the precision-building of machines."

A review of the construction and use of the Stapley Pulper was given by Dwight Jones, of E. D. Jones & Sons Company, Pittsfield, Massachusetts. An interesting highlight of this subject was the presence at the meeting of Stephen G. Stapley and William Subard, superintendent and master mechanic, respectively, of Provincial Paper Limited, Thorold, Ontario. These gentlemen are co-inventors of the Stapley Pulper, and they took part in a discussion period following the talk by Mr. Jones.

Labor Relations Counselor to a group of mills in western New England, Harold T. Martin, spoke on "Labor-Management Relations." He has often presented timely addresses on this topic at papermaking conventions.

◆

N. Y.-CAN. DIV. SUPTS. MEETING PLACE ANNOUNCED

They call it the Ship and Shore 1947 Convention of the New York-Canadian Division of The American Pulp and Paper Mill Superintendents Association, Inc. It will be held September 8-12 at The Manoir Richelieu, Murray Bay, Quebec.

Unique program events are being planned, and a number of top personalities are expected. Those planning to attend the meeting will arrange passage to Montreal; thence by steamer to Quebec City; from there on to Murray Bay. Back to Montreal by steamer.

◆

PACIFIC COAST BRANCH OF CAN. TECHNICAL SECTION HAS FIRST ANNUAL MEETING

The first annual meeting of the Pacific Coast Branch, Technical Section of the Canadian Pulp and Paper Industry, was held at Vancouver (B.C.) on April 25 and was attended by more than 70 members.

New officers elected for the coming year are:

President—John Ashby, Westminster Paper Company, Ltd.

ANNUAL SUPERINTENDENTS CONVENTION

The annual meeting of the American Pulp and Paper Mill Superintendents Association will be held at the Edgewater Beach Hotel, Chicago, May 22 through 24. We'll be seeing you there.

Vice President—H. Ostrowski, Pacific Mills, Ltd.

Secretary-treasurer — Miss M. E. Logan.

Executive Committee—H. MacBean (Woodfibre), and J. Fraser (Port Alice), both with the British Columbia Pulp and Paper Company; M. Rhodes, Sorg Pulp Company, Ltd.; C. E. Craig, Sidney Roofing and Paper Company, Ltd.; W. MacGillivray, Powell River Pulp and Paper Company; and R. Stringer, Bloedel, Stewart & Welch, Ltd.

The luncheon guest speaker was Philip W. Barchard, chief engineer of the British Columbia Electric Railway Company's gas division, who spoke on "Industrial Fuels." Speaking of the trend of industry to become established in British Columbia, the speaker warned the meeting that the costs of power development should be assayed before making fuel commitments for plant operations. He pointed out that "the fuel situation through the whole Pacific Northwest is being given much sober thought and reflection at this time. The three principal industrial fuels in British Columbia are coal, oil and gas, and, for the purpose of his talk, he included "power." Mr. Barchard spoke of the potential development of new low-priced coal workings which would insure ample supplies for some years to come, but he also pointed to the fact that this is contingent upon the industrial demand which is dictated by the price of coal as compared to other fuels. He said that "urgent need for planning by industrialists and labor alike will be necessary if industry, based on this fuel, is to be attracted by Western British Columbia. The speaker also said that "power from electrical energy is our greatest hope in the near future for attracting industrial wealth." The total developed horsepower in British Columbia provides 800,000 hp. in hydro, 62,000 in steam, and 2,000 in combustion engines. Of hydro development, 703,167 hp. is used in central station industry, 105,950 in the pulp and paper industry, and 54,907 in mining and other industries. Undeveloped hydro-power is estimated at 7,023,000 hp. at minimum flow with 10,998,000 hp. as the estimated potential power at an ordinary six months water flow.

Other subjects of interest to the pulp and paper industry were discussed by various speakers during the day's sessions.

W. R. Dickie, of the A.I.M. Engineering & Supply Company, spoke on "The Application of Special Steels to the Pulp and Paper Industry"; D. Bamford, groundwood superintendent of Pacific Mills, Ltd., discussed "Modernization of a Groundwood Mill"; A. W. Lash, chief construction engineer of the B. C. Power Commission, dealt with "Activities of the B. C. Power Commission"; and Dr. R. F. Patterson, of the research department of Powell River Pulp and Paper Company, Ltd., spoke on "The Chemical Nature of Wood."

R. C. Bledsloe, Powell River Pulp and Paper Company, Ltd., was chairman.

◆

▶▶▶ THE BOOK PAPER Manufacturers Association held its annual convention in New York, April 2. George Olmsted, Jr., president of S. D. Warren Company, was re-elected president, and P. H. Glatfelter, president and treasurer of P. H. Glatfelter Company, was re-elected treasurer.

◆

CANADIAN SUMMER MEETING TO BE HELD AT ST. ANDREWS-BY-THE-SEA, NEW BRUNSWICK

The summer meeting of the Canadian Pulp and Paper Association will be held June 11-13, 1947, at the Algonquin Hotel, St. Andrews-by-the-Sea, New Brunswick.

Group discussions are being arranged by the various Technical Section standing committees and tentatively will include discussions on the following subjects:

A Practical Discussion on High Speed Machine Headbox Operations
Pitsh Control
Unit Sub-stations
Infrared Drying
Flash Drying of Bark
Drying of Paperboard
Morden Refiner Operation
Paperboard Machine Improvements
Screening
Re-use of White Water in the Groundwood Mill
Pit Testing
Woods Operations
Uses for Sulphite Pulps
Installation, Development and Care of Linings for Digesters, Blowpits, etc.
Causticizing
Alkaline Pulping Penetration Studies
Kraft Process By-products
Fiber Suspensions

There will be an official Technical Section Luncheon and the annual golf tournament. Advance hotel

GET BOTH SIDES OF THE STORY ON INGACLAD

STAINLESS-CLAD STEEL

● There's nothing one-sided about IngAclad—the Stainless-Clad Steel that provides 100% protection on the exposed or contact side—*at about half the material cost of solid stainless.*

One side of the IngAclad story is its 20% cladding of solid stainless steel for complete protection against rust, corrosion, abrasion, erosion.

The other side is IngAclad's 80% backing of mild steel—which makes it easier to fabricate than solid stainless—and cuts both material and fabricating cost.

That's the IngAclad story—both sides—in a nutshell. Remember it—for any application where stainless steel is needed only on the contact side. Further details on request—no obligation.

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Borg-Warner Corporation
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reservations indicate that a large attendance may be expected. Reservations should be made early and should be directed to J. Cashman, Chateau Frontenac Hotel, Quebec City, P. Q. The Technical Section does not handle room reservations.

◆

▶▶▶ A FIVE-DAY SEMINAR on the organization and technique of industrial standardization will be held during the week of June 23-27 at the Engineering Societies Building, 29 West 39th Street, New York City. The course will be given by Dr. John Gaillard, engineer in charge of mechanical standards for the American Standards Association and lecturer on industrial standardization at Columbia University.

◆

TAPPI SCHEDULE CALLS FOR 5 FALL MEETINGS

The April 25 issue of *TAPPI Bulletin*, published by the Technical Association of the Pulp and Paper Industry, outlines tentative plans for *five fall meetings* to be held this year. The new schedule follows the successful experiment of 1946 when three meetings were held in place of the single general meeting that was customarily held each fall before the war.

The five meetings tentatively scheduled for the fall of 1947 are as follows:

Fundamental Research: To be held in Appleton, Wisconsin (probably September 3-6, 1947). It is possible that this meeting will be held in co-operation with the United Nations, F.A.O. Wood Chemistry Committee. Its purpose probably will be directed to defining the fundamental research problems that should receive early consideration. Harry F. Lewis, of the Institute of Paper Chemistry, will be the general chairman.

Acid Pulping: To be held at Minneapolis, Minnesota (September 24-27, 1947). This will be the Association's first convention devoted primarily to the manufacture and technology of sulphite pulping. It is being held at Minneapolis to provide easy access to Pacific Coast members as well as to the many sulphite makers in the Lake States and Canada. George H. McGregor, of the Minnesota and Ontario Paper Company will be the general chairman.

Alkaline Pulping and Chemical Products: To be held at Asheville, North Carolina (October 6-8, 1947). This will be the third in the session of very successful meetings sponsored by the kraft pulping industry. K. G. Chesley, of the Crossett Lumber Company, and W. P. Lawrence, of the Champion Paper and Fibre Company, will be the general chairman.

It is quite possible that the Southern and Southeastern Divisions of the Superintendents Association will meet in Asheville at the same time. Both organizations will combine their mill visits and social activities, but the sessions in which papers are presented and discussed probably will be held separately and in separate neighboring hotels.

Fibrous Agricultural Residues: This meeting will be held at Alton, Illinois (date not selected). It will be the fifth in a series of meetings sponsored by this committee. The previous meetings were held in New York and Peoria, Illinois. Special attention will be given to the technical problems relating to strawboard manufacture. Sam. I. Aronovsky, of the Northern Regional Research Laboratory (Peoria), will be the general chairman.

The Second Engineering Conference of the Pulp and Paper Industry: To be held in Philadelphia (November 3-5, 1947). This meeting will be a sequel to the excellent conference held in Milwaukee in 1946. Its program will be organized to provide an opportunity to discuss major current engineering problems that have arisen because of the extensive construction and rehabilitation of a large number of mills. J. W. Hemphill, of Johns-Manville, Inc., will be the general chairman.

◆

CHEAPER WOOD WILL BE DISCUSSED AT NE WOOD UTILIZATION COUNCIL

The next meeting of the Northeastern Wood Utilization Council will take place at the Hotel New Worden, Saratoga Springs, New York, on June 13.

The theme of the meeting will be "Cheaper Wood for Chemical Conversion." Recognizing that cost reduction in wood harvesting is an important factor in the future development of the wood-chemical and other wood using industries, the Council will review in papers and field trips the progress attained in this field.

The meeting is open to members only as well as invited guests who can participate in discussions. Further details may be obtained by addressing E. L. Heermance, secretary, P. O. Box 1577, New Haven, Connecticut.

◆

▶▶▶ AT A THREE-DAY convention recently at the Waldorf-Astoria in New York, The National Paper Trade Association elected as its president Arthur W. Towne of San Francisco, California, vice president and manager of Blake, Moffitt & Towne.

◆

COMING EVENTS

May 22-24—Annual meeting of The American Pulp and Paper Mill Superintendents Association, at the Edgewater Beach Hotel, Chicago, Illinois.

May 22-31—Mid-America Exposition, at the Cleveland Public Auditorium, Cleveland, Ohio.

June 11-13—Summer meeting of Technical Section of the Canadian Pulp and Paper Association, at the Algonquin Hotel, St. Andrews-by-the-Sea, New Brunswick.

June 12-13—The American Society of Mechanical Engineers, Wood Industries National Conference, at Madison, Wisconsin.

Sept. 8-12—Second National Instrument Conference, Stevens Hotel, Chicago.

Sept. 8-12—Annual meeting of New York-Canadian Division of The American Pulp and Paper Mill Superintendents Association, at The Manoir Richelieu, Murray Bay, Quebec.

Oct. 21-25—The Pacific Chemical Exposition at the San Francisco Civic Auditorium, San Francisco, California.

Dec. 1-5—Annual meeting of The American Society of Mechanical Engineers, Atlantic City, New Jersey.

STATED MEETINGS

Chicago Professional Paper Group meets the third Monday of each month at the Chicago Bar Association, Chicago, Illinois.

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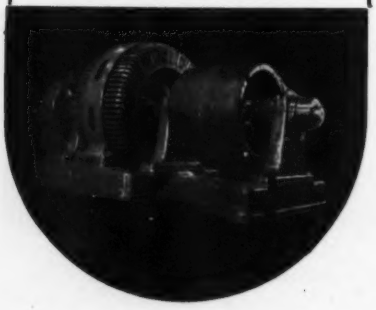

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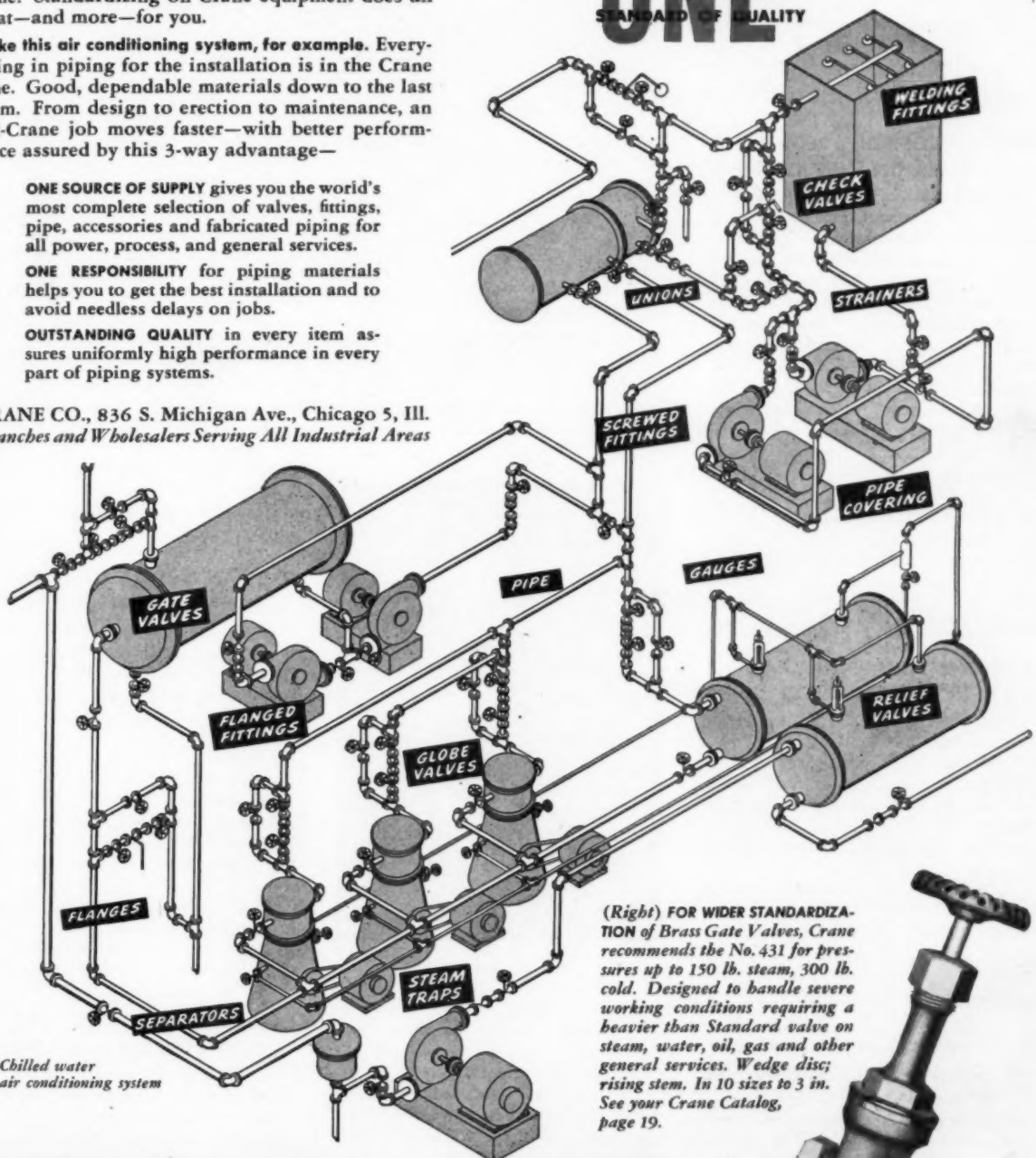
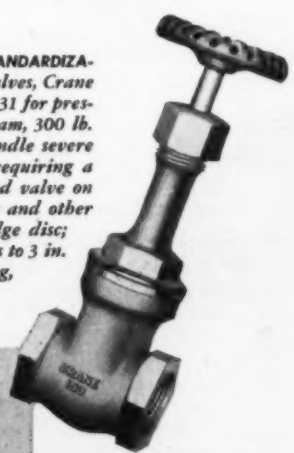


Chilled water air conditioning system



(Right) **FOR WIDER STANDARDIZATION** *of Brass Gate Valves, Crane recommends the No. 431 for pressures up to 150 lb. steam, 300 lb. cold. Designed to handle severe working conditions requiring a heavier than Standard valve on steam, water, oil, gas and other general services. Wedge disc; rising stem. In 10 sizes to 3 in. See your Crane Catalog, page 19.*

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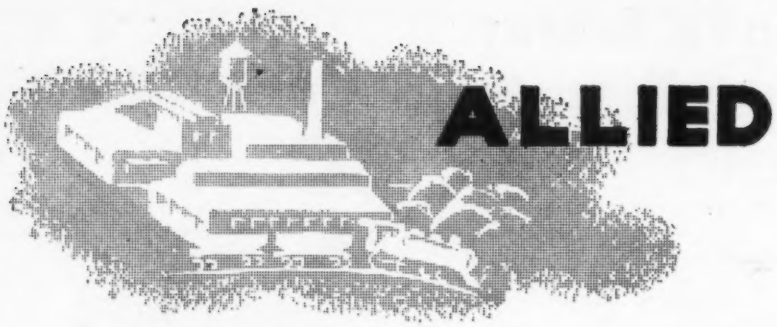


NORTON COMPANY BEGINS WORK ON NEW BUILDING

Ground has been broken for the new $3,500,000 Norton Company plant at Worcester, Massachusetts. Of one-story design the building will occupy nearly five acres of working space and will represent a long-planned attempt to create ideal working conditions for employees in the abrasive industry. The entire building will be air-conditioned, fluorescent lighted, and the latest developments in equipment and machines will be installed. It is hoped that the plant will be completed and in operation by July 1948.

A new addition to the power plant is also under way. Plans for this enlargement include installation of a Riley steam generator capable of delivering 60,000 pounds per hour. The estimated cost is $325,000 and is expected to be completed by July 1948.

◆

BAILEY METER APPOINTS PUERTO RICAN SALES AGENT

New agent for the Bailey Meter Company in Puerto Rico is the Portilla Corporation, which will act as the agency for the sales, installation and servicing of Bailey equipment in Puerto Rico, Republic of Haiti, Dominican Republic and the Virgin Islands.

The Portilla Corporation owns and operates Sobrinos de Portilla, Inc., which operates a foundry and machine shop in the West Indies.

Bailey Meter also has agents in Mexico, Argentina, Brazil, and Cuba.

◆

H. K. FERGUSON CO. NAMES DR. LEE AS REPR. IN CHINA

The appointment of Dr. Gwoh-Liang Lee as its representative in China has been announced by The H. K. Ferguson Company, Cleveland. The Ferguson company has operated without sales representation in the Far East since the beginning of the war. Hankow is the headquarters of the newly appointed Chinese representative.

Although a native Chinese, Dr. Lee is well known in Chinese-American engineering circles. He received his Ph. D. from Cornell University and during the war years he was associated with The Ferguson Company in the design of industrial facilities for the Ordnance Department and Chemical Warfare Service.

◆

TOWMOTOR CORP. NOW HAS A CAMDEN (N. J.) OFFICE

The opening of a factory sales and service branch for Towmotor Fork Lift Trucks, Tractors and accessories has been announced by Towmotor Corporation, Cleveland.

Ray M. Scott, Jr.

The new office will be located at 1171 Cooper Street, Camden, New Jersey, and the sales activity will be under the supervison of Ray M. Scott, Jr., who has been associated with Towmotor in various key positions for several years. William Wilhelm, service manager, will be in charge of complete repairs and parts facilities and will be assisted by a staff of factory trained personnel.

◆

▶▶▶ A NEW PLANT just purchased from the War Assets Administration by the General Electric Company at Decatur, Illinois, will be converted into one of the largest plastics moulding plants of its kind in the country.

◆

▶▶▶ A VOTE OF STOCKHOLDERS at the National Oil Products Company's annual meeting on March 27 officially approved the change of the company's name to Nopco Chemical Company. This change was effected in order to identify the company more readily with the chemical industry.

◆

SINCLAIR BROTHERS ACQUIRE PURVES MACHINE WIRE CO.

Purchase of the business of the Purves Machine Wire Company, Inc., of Holyoke, Massachusetts, by Richard M. Sinclair and his brother, David H. Sinclair, has been announced.

The Purves plant is located in the former Zeloid mill, now owned by the City of Holyoke. It has four high-speed wire-weaving looms with all accessory equipment. Sale of the business was negotiated by Mrs. Isabel Langhauser, of Holyoke and Chicago, daughter of Andrew Purves, founder. The Sinclair brothers are sons of Mr. and Mrs. Peter S. Sinclair. Their father is owner of the Sinclair Company, one of the larger wire cloth manufacturing concerns.

◆

JOHNS-MANVILLE ACQUIRES GOETZE GASKET & PKG. CO.

A purchase, completed on March 31, transferred all factories and other properties of the Goetze Gasket & Packing Company, New Brunswick, New Jersey, to Johns-Manville Corporation.

Goetze gaskets will be produced as formerly at the Goetze plant in New Brunswick and sold by Johns-Manville under the Goetze name. Lewis H. Brown, Johns-Manville board chairman, who made the announcement, stated it is also expected that an expanded use will be made of Goetze's plant facilities, skilled craftsmanship, and highly specialized knowledge in the manufacture of metallic gaskets.

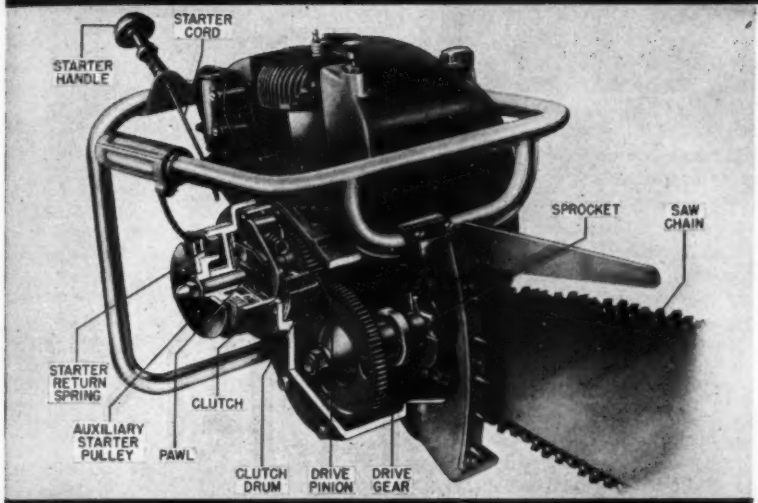
◆

"REVERE" AND "YALE" ARE GIVEN BRAND NAME AWARD

Eighteen brand names used by New York firms for 50 years or more were among 30 brand names honored recently by the Brand Names Foundation when certificates of public service were presented at a one-day meeting of business, industry and advertising leaders at the Hotel Waldorf-Astoria.

Of the eighteen, "Yale," brand name since 1868 of the locks, builders hardware, and other products made by the Yale & Towne Manufacturing

SIMPLE CONSTRUCTION



Here's the simple design and construction of Reed-Prentice Timberhog gasoline engine portable chain saws. The saw chain is composed of strongly riveted cutting and raking units. Its 2 cycle, 4 H.P. gasoline engine occupies a minimum of space and is extra light weight because of die-cast aluminum or magnesium parts. Simple construction facilitates maintenance with resulting economical production.

Easy to Operate!

The Timberhog saw is easy to operate! You start it like an outboard motor. All controls are conveniently located. Its light weight makes the one and two-man Timberhog easy to carry and to use for all types of felling, bucking and limbing in the rough country. The one man 20″ model weighs 53 lbs.; the two-man 24″ and 30″ weigh 55 lbs. and 58 lbs.

You'll find Timberhog saws economical because of their low-initial cost, low fuel consumption (consumes 1 qt. of fuel per hour), minimum maintenance and increased production speed. They'll do your work 5 times as fast as hand cutting! Write now to Dept. K for folder and name of nearest distributor handling the complete line of gasoline, air and electrically driven Timberhog chain saws.

Notching with 2 man Timberhog saw on the side toward which the tree should fall.

Making the back cut to meet the notch on the opposite side.

Timber! Retreating from falling tree to preselected positions.

"TIMBERHOG"
REED-PRENTICE CORP.
WORCESTER SAWS MASS., U.S.A.

NEW YORK OFFICE:
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Company was presented an award. The oldest name honored with a Centennial certificate was "Revere," the name applied to products of the Revere Copper and Brass Incorporated, of New York City and Rome, N. Y., which has an unbroken service record since 1801 when it was founded by Paul Revere.

◆

MONSANTO ALREADY PLANS REBUILDING OF STYRENE PLANT AT TEXAS CITY

Plans for rebuilding Monsanto Chemical Company's styrene plant at Texas City, Texas, almost demolished when a shipload of ammonium nitrate exploded in the bay nearby are already under way. Subject to further examination, parts of the plant may be back in production within six months, according to a recent statement by William M. Rand, president of the company.

The site must be cleared of wreckage and this job is being done as rapidly as possible. Meanwhile, Monsanto is attempting to find unused wartime styrene facilities which it may operate on a temporary basis. Under normal conditions—if no delay of materials occurs—Mr. Rand believes the entire plant may be rebuilt within 18 months.

The board of directors of Monsanto has appropriated $500,000 for relief among employee victims of the Texas City disaster. Benefits to be paid from this sum are over and above all the company's legal liabilities, which are fully covered by insurance. Relief contributions have been sent in from employees of Monsanto plants at Oak Ridge (Tenn.), Trenton (Mich.), Seattle, Anniston (Ala.), and St. Louis. At Oak Ridge, where Monsanto operates the Clinton Laboratories for the U. S. Atomic Energy Commission, the mechanical department worked one extra day and sent the payroll as a sympathy offering.

SECOND GREEN CROSS FOR SAFETY CAMPAIGN BEGINS

The first Green Cross for Safety Campaign was started a year ago (Cf. P.I. and P.W., May, 1946, p. 244). The Second Campaign for public support will be launched in May in a number of cities from coast to coast.

The object of the campaign is to provide the financial sinews of war to local chapters and councils. An adequate local budget makes possible a strong, effective and continuing accident prevention program.

The campaign will be managed by Earl Campbell, director of the Field Organization of the National Safety Council. Mr. Campbell had long experience as the head of the West Coast Regional Office of the National Safety Council, and he took an active part in the Green Cross campaign in the West last year.

The nation's greatest foe—even in peacetime—is *accidents*. The work of the National Safety Council in its relentless war on accidents has been most effective. In 1913, the national safety movement began. Had the accident death rate remained at 1913 levels, approximately 370,000 more Americans would have died in accidents during the past 34 years. The NSC has planned campaigns through its various sections; it has had the support of national groups, the press, and the radio. However, prepublication figures for the National Safety Council's 1947 edition of *Accident Facts* show that the 1946 death toll from accidents was 100,000—about 4 per cent above the 1945 figure of 95,918.

The National Safety Council has fostered the formation of Green Cross chapters in all major American cities. These chapters are directed by business and community leaders with one purpose—to make that community a safer place in which to live, work, and play.

Many more lives could be saved if you and your neighbors give generously to your local Green Cross for Safety Campaign. If your community does not have an organized chapter, bring the subject to the attention of influential citizens. Give the *Green Cross Movement* your whole-hearted support.

(Data used in this item were furnished by the National Safety Council, Chicago.)

◇

SAFETY SCORES

▶▶▶ THE EIGHTH MONTH of The Paper Industry Safety Contest for 1946-1947 finds fourteen participants with a perfect record. The frequency rates continue to show a reduction for the current contest, compared with the rates for the contest of last year. All contestants combined are showing an 11 per cent reduction. The Remanufacturing Division has made the best reduction in accidents—18 per cent. February rates are 10 per cent below January. The following list of companies finished February with perfect scores:

Division I—Pulp and Paper Mills

Group A—

(None.)

Group B

P. H. Glatfelter Co., Spring Grove, Pa.

Group C

Strathmore Paper Co. (West Springfield Mills), West Springfield, Mass.

Certain-teed Products Corp., E. St. Louis, Ill.

Certain-teed Products Corp., York, Pa.

Group D

Strathmore Paper Co. (Woronoco Mill No. 1), West Springfield, Mass.

E. I. du Pont de Nemours & Co., Inc. (Russell Plant), Huntington, Mass.

International Paper Co., Livermore Falls, Maine.

Certain-teed Products Corp., Buffalo, N. Y.

International Paper Co., Riley, Maine.

Division II—Paper & Board Remanufacturing

Group A—

(None.)

Group B

Old Colony Envelope Co., Westfield, Mass.

Kimberly-Clark Corp., Memphis, Tenn.

Bird & Son, Inc. (Roofing Plant), Shreveport, La.

Fort Wayne Corrugated Paper Co. (Rochester Div.), Rochester, N. Y.

The Flintkote Co. (Hollywood Paper Box Div.), Los Angeles, Cal.

Thilmany Pulp & Paper Co. (Bag Mill), Kaukauna, Wis.

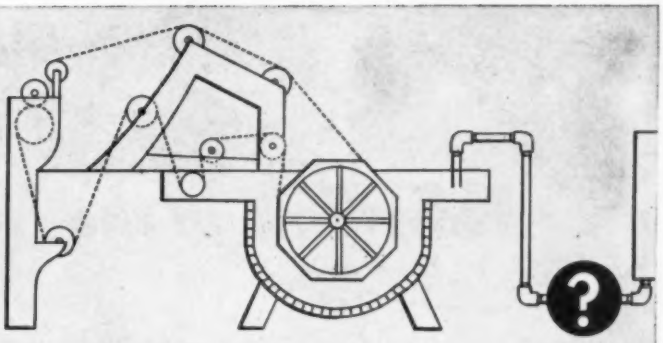
Gaylord Container Corp., Milwaukee, Wis.

Bay West Paper Co., Green Bay, Wis.

Correction—An error is acknowledged in the scores that appeared on this page of the April issue. Under Group D, of Division I, Container Corporation of America, Wilmington, Delaware, was erroneously listed as having a perfect record. Omitted from the same group was the name of Certain-teed Products Corporation, Buffalo, New York, which company had maintained a perfect record up to the time of the last report, February 28.

PROBLEM: A large paper mill requires a pump for transferring white water to the save-all at a rate of 1600 G.P.M. against a total dynamic head of 55 ft.

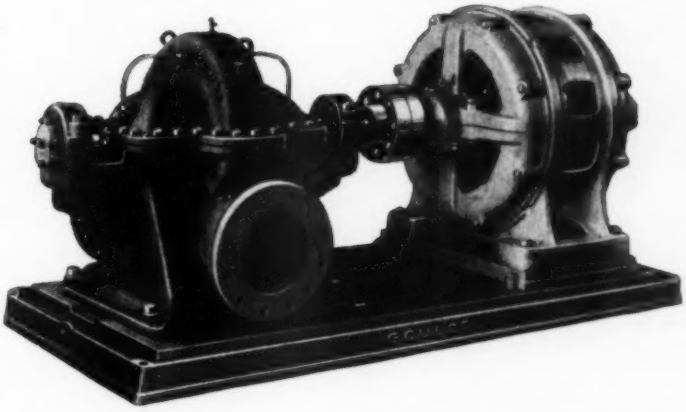
Which Goulds Pump is *the* Pump for *the* Job?



SOLUTION: GOULDS SINGLE STAGE DOUBLE-SUCTION CENTRIFUGAL

The 6″ pump with a 30 H.P. 1750 R.P.M. motor withstands long hard service with efficiency and a minimum of attention.

These pumps are furnished in sizes from 2″ to 16″ providing capacities of from 80 to 14,500 G.P.M., and heads to 500 ft. depending upon capacity. When *you* have a pump problem call or write Pump Headquarters or your nearest Goulds office.



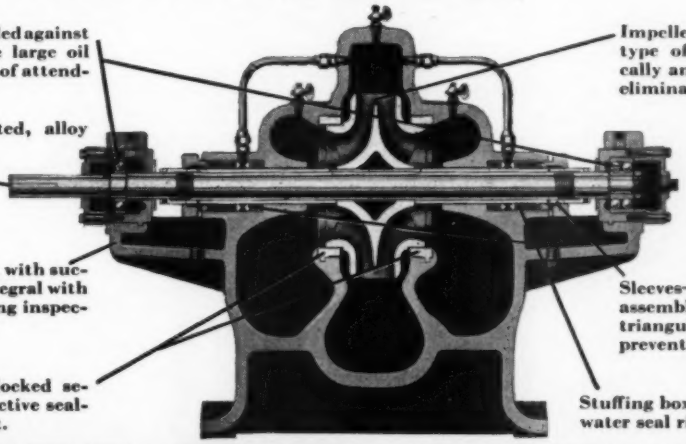
Here's why the "Goulds Single Stage Double-Suction" *IS* EFFICIENT AND DEPENDABLE

Bearings—heavy duty, sealed against moisture and dust; have large oil reservoirs for long periods of attendance-free operation.

Shaft—heavy, heat treated, alloy steel.

Casing—horizontally split with suction and discharge cast integral with lower half of casing, making inspection easy and quick.

Wearing rings—bronze, locked securely in position for effective sealing, renewable at low cost.



Impeller—enclosed double suction type of high efficiency; hydraulically and mechanically balanced to eliminate vibration and wear.

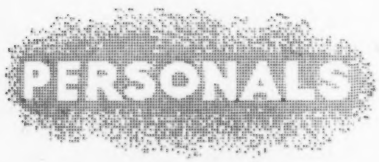
Sleeves—heavy section bronze, easily assembled or replaced; have special triangular micarta packing ring to prevent leakage along shaft.

Stuffing boxes—extra deep with bronze water seal rings.

GOULDS PUMPS, INC. • SENECA FALLS, N. Y.

GOULDS PUMPS, INC.

the PUMP FOR the JOB



ARTHUR READY NOW WITH NATIONAL CONTAINER CORP.

Arthur G. Ready has joined the Kraft Pulp and Board Division of the National Container Corporation, Jacksonville, Florida, as mill development engineer to aid in the planning and developing of a further expansion program, and to follow through on the accomplishment of such a program if adopted.

Mr. Ready has had broad experience in the pulp and paper mill development field in the southern states, acquired while with George F. Hardy, consulting engineer, and later with the St. Marys Kraft Corporation, and Rayonier, Incorporated.

With George F. Hardy, his first southern work was at Moss Point, Mississippi, in 1924; then after a year in Everett, Washington, at the Everett Pulp and Paper Company mill, he returned to the South and spent several years at the Brown Paper Mill Company, Monroe, Louisiana.

After a year with the Robert Gair Company in its northern mills, Mr. Ready returned to the George F. Hardy organization in 1935 when the Union Bag and Paper Corporation mill construction was started in Savannah.

In 1938, he went to Lufkin, Texas, on the construction of the Southland Paper Mills, Inc., the first newsprint mill using southern pine. After the completion of that plant, he was sent to St. Marys, Georgia, in 1940 to start the construction of the St. Marys Kraft Corporation's pulp and paper mill. At that time, he left the George F. Hardy organization and joined the St. Marys Kraft Corporation as mill manager, supervising the construction and the early operations of the mill.

In 1943, Mr. Ready joined Rayonier, Incorporated, and was engaged in certain engineering assignments that took him to several state of Washington mills as well as the mill at Fernandina, Florida.

In late 1944, he joined the Cia Industrial de Antenquique, S. A. of Guadalajara, Jal, Mexico, to assist them in the selection and purchase of equipment for the new kraft pulp and paper mill and the selection of the personnel for the initial operations.

Mr. Ready returned from Mexico recently.

◆

DESHLER NOW PRESIDENT OF EDGAR BROS.—EDGAR MADE BOARD CHAIRMAN

At the company's annual board meeting, held April 22, Edgar Brothers Company, New York City, elevated its president, H. T. Edgar to the office of chairman of the board. At the same meeting, James Deshler was elected president and general manager.

Mr. Edgar has been president of the company for the past thirteen years. Mr. Deshler is a graduate of Williams College and New Jersey Law School. He is a former officer of Johnson & Johnson (New Brunswick, N. J.), and until his election to the Edgar Brothers presidency, he was an officer and director of Ortho Pharmaceutical Corporation and subsidiaries. He has served on the Edgar board of directors and has been an officer and member of its executive committee.

James Deshler

Upon taking over the general management, Mr. Deshler will divide his time between the company's office in New York City, and Metuchen, New Jersey, as well as its extensive mines and processing plants in the Southeast.

◆

▶▶▶ As its representative in Florida, the Liquid Conditioning Corporation of Linden, New Jersey, has appointed *William O. Lovejoy*. He will handle the sale of the company's Liquon equipment and Liquonex materials for all water treatment processes and for conditioning of other liquids.

◆

▶▶▶ Recent promotions announced by the Longview Fibre Company, Longview, Washington, are: *John F. Hart*, former technical control superintendent, has been promoted to technical superintendent taking over the work formerly done by the assistant resident manager, *Carl Fahlstrom; H. W. Dauterman* will be assistant paper mill superintendent; *A. W. Russell*, formerly groundwood foreman, has been promoted to tour foreman and *Henry Anderson* will succeed Mr. Russell.

◆

TWO VICE PRESIDENTS ARE NAMED BY ST. REGIS CO.

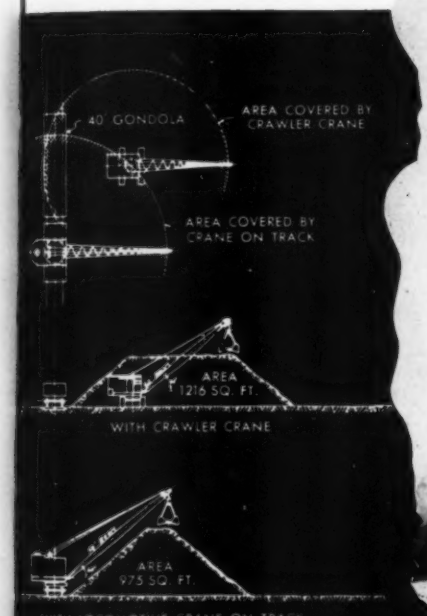
New vice presidents of the St. Regis Paper Company (New York) are William H. Versfelt and Edward G. Murray. Mr. Versfelt is treasurer of both the St. Regis Paper Company and its sales subsidiary, the St. Regis Sales Corporation. Mr. Murray is the executive vice president of the sales corporation.

Also announced is the election of Ashley D. Pace and Gordon W. Wattles as directors. Mr. Pace is a vice president and director of the Florida Pulp & Paper Company and Alabama Pulp & Paper Company; Mr. Wattles was formerly associated with another firm.

◆

▶▶▶ A total of 96 years of service is represented by two veteran employees of Crane & Company, Dalton, Massachusetts, who recently retired. *Burton A. Williams*, foreman of the maintenance crew in the Old Berkshire mill, has sequestered after nearly 37 years of service. *Maurice A. Callahan*, employed in the rag sorting room in the Bay State mill, who has done nearly every type of job in that mill during his 59 years and three months, has withdrawn on pension.

for *Greater Coverage* in the PULP YARD


40' GONDOLA
AREA COVERED BY CRAWLER CRANE
AREA COVERED BY CRANE ON TRACK
AREA 1216 SQ. FT.
WITH CRAWLER CRANE
AREA 975 SQ. FT.
WITH LOCOMOTIVE CRANE ON TRACK

THE Northwest Crawler Crane expands your operating range and doubles it over locomotive crane equipment. Look at the diagram. The Northwest gives you a full 180° coverage, assuring better use of available areas and increasing storage within reach of either hauling equipment or the pond.

Your Northwest can travel up and down the length of a train without an extra line of track. It can be supplying pulp to the mill by loading trucks or feeding to the pond.

Crawler mobility means high loading capacity whenever and wherever you want it—in the pulp yard, at the mill or at the loading dock. It is a proved piece af all 'round paper mill equipment—does things no other type of material handling equipment can do.

Plan ahead now to have Northwest mobility, versatility, and dependability. Let us give you more details on the capacity machine you will require.

NORTHWEST ENGINEERING COMPANY
1507 Field Bldg., 135 South LaSalle St., Chicago 3, Ill.

NORTHWEST

The Crane that goes Anywhere!

4 to 44 tons

TIPKA AND JENKINS NOW WITH BIRD MACHINE CO.

Vernon L. Tipka and Alexander Jenkins, Jr., both widely known throughout the paper industry, are now associated with Bird Machine Company of South Walpole, Massachusetts.

Mr. Tipka started his career in the industry with the Crown Zellerbach Corporation and was with that or-

V. L. Tipka

ganization for several years. Later he was with the Hawley Pulp and Paper Company (Oregon City, Ore.) and still later became mill manager of the Paper Corporation of America at Cheboygan, Michigan. After spending some time at South Walpole, Mr. Tipka will transfer to the Bird Machine Company's Evanston (Ill.) office in a sales capacity.

Mr. Jenkins, through his fifteen years' experience as purchasing agent for Hollingsworth & Whitney (Mobile, Ala.), has acquired extensive knowledge and experience with the procurement of pulp and paper mill machinery and equipment. He joins the sales department at South Walpole.

Alexander Jenkins

◆

▶▶▶ Chosen president of both the Nashua Gummed and Coated Paper Company and the Nashua Package Sealing Company, of Nashua, New Hampshire, is *Vasco E. Nuniez*. Also elected at the annual meeting was *Eliot A. Carter*, vice president and assistant treasurer; *Oscar L. Tracy*, treasurer; *Hubert L. Clark*, clerk; and *Trevor Gautier*, secretary.

◆

▶▶▶ At a meeting of directors recently, *Ivan L. Nixon* and *Ben A. Ramaker* were elected vice presidents of Bausch & Lomb Optical Company of Rochester, N. Y. *William W. McQuilkin*, company secretary, was elected assistant treasurer. *Joseph W. Taylor*, a member of the firm's legal staff, was named assistant secretary.

◆

▶▶▶ New sales manager for American Can Company in Canada is *J. B. Misenhimer*, who has been in the general sales department of the company's New York office. During the war, Mr. Misenhimer served as a full time consultant to the Containers Division of the WPB, in which capacity he helped to set up controls for the conservation of tin and other materials. He rejoined the Canco sales staff in 1944. His new position will be that of supervisor of all company sales activities in the Dominion from its Canadian Division headquarters at Hamilton, Ontario.

◆

▶▶▶ At a meeting of the board on April 23 *Norris N. Wright* was elected president of the Continental-Diamond Fibre Company, Bridgeport, Pennsylvania. He succeeds his brother, the late J. Pilling Wright, who passed away April 18.

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▶▶▶ A new director of Diamond Alkali Company, Pittsburgh, is *Fred W. Fraley*, vice president in charge of sales. Through nineteen years of service with Diamond, Mr. Fraley has gained broad experience in the heavy chemical industry.

◆

▶▶▶ Appointments announced by W. I. Galliher, the executive sales manager of the Columbia Chemical Division of Pittsburgh Plate Glass Company, are *Glenn W. Green* as Chicago sales representative and *Walter T. Johnson* as the New York district sales manager.

ROBSON & LAIRD CHANGE POSITIONS WITH B-S-W

With the completion of its new sulphate pulp mill at Port Alberni, Vancouver (B. C.), Bloedel, Stewart & Welch Limited, is reorganizing its staff preparatory to handling its expanding activities.

Charles Y. Robson, who has been resident manager at Port Alberni since

Charles Y. Robson

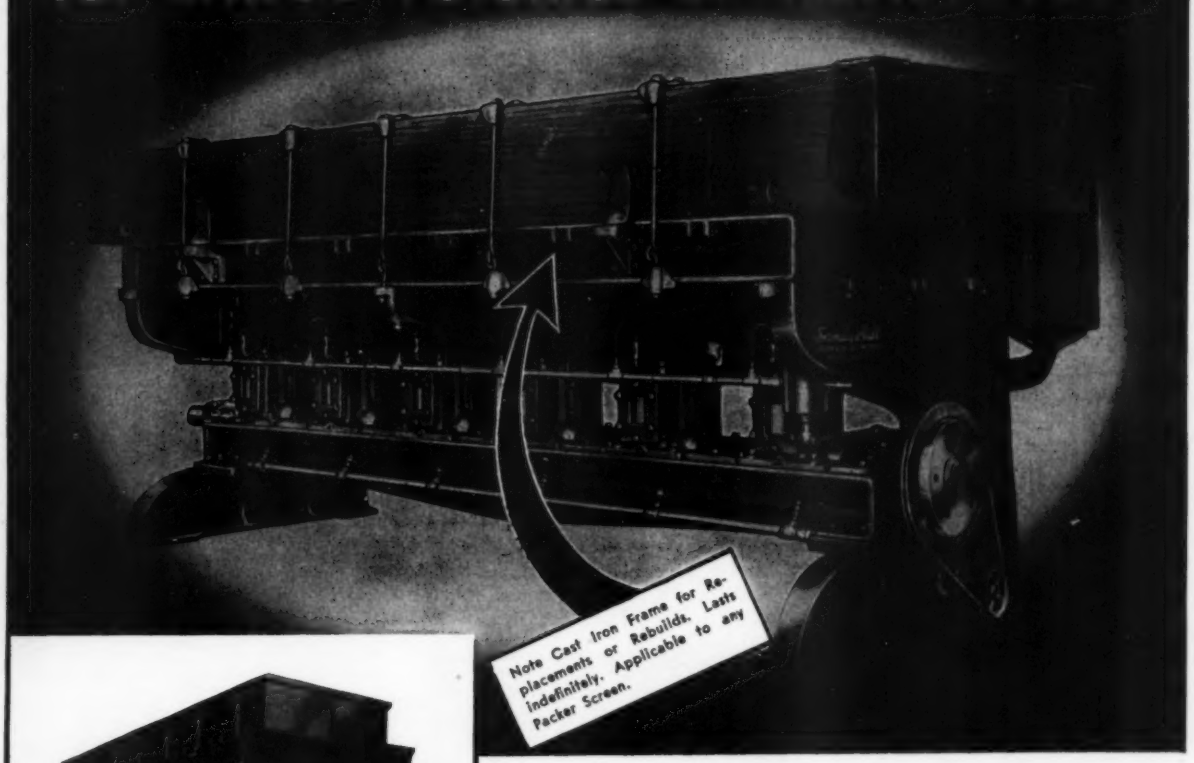
January 1, 1946, is giving up the lumber sales work and will devote his time to the wider operations soon to be effective.

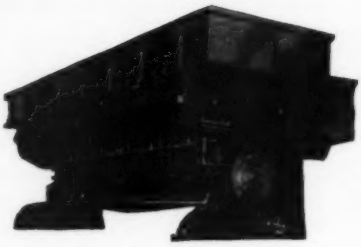
Robert Laird, secretary of the company, becomes, in addition, general manager in charge of all of the company's sales policies.

Frank Barry, formerly assistant sales manager, has been appointed sales manager and will reside in Port Alberni.

Robert Laird

Sandy Hill Packer Super Screen for LARGE Volumes of CLEAN Stock





Now available... ALL-METAL CONSTRUCTION

Illustrated above is the Sandy Hill Roller-Shoe Packer Screen with the new all-metal vat and flow box. Built of smooth, non-corrosive metal, these units are simple in design, light in weight, but exceptionally sturdy and capable of serving satisfactorily for many years without attention or replacement. Units are interchangeable, so that existing Packer Screens can be easily modernized by replacing wooden parts with the new all-metal units.

6,000 Packer Screens in the country's best equipped mills attest their wide acceptance and efficiency. New advances in design and performance now assure further increased efficiency, capacity and service life.

Fitting naturally into any mill set-up, the Sandy Hill Packer Super Screen can be depended on to pass a large volume of stock, removing dirt, knots, string and other foreign matter effectively, quickly and thoroughly, with a minimum of attention and mechanical complication.

Also grades fibers in pulp production and cards fiber bearing stock, in conjunction with fourdrinier or board machines, and may be operated as a centrifugal secondary, a round screen tailer or a centifugal system tailer.

- Fits production needs and plant layout.
- Continuous lubrication system.
- Reduced vibration.
- Fully accessible for cleaning.
- Anti-friction bearings on roller-shoe journals.
- Low maintenance.

Write for new Bulletin

THE SANDY HILL IRON & BRASS WORKS
HUDSON FALLS, N. Y.

The announcement from the company states that the appointments just made will effect no change in other personnel handling sales for the four divisions of the company.

Mead Sales Company has been appointed sales agent for the pulp division in the United States, and Price & Pierce for British pulp sales.

◆

V. B. BROWNE IS NOW RESEARCH CONSULTANT WITH HEPPENSTALL CO.

Vere B. Browne has been named research consultant to Heppenstall Company, Pittsburgh. Mr. Browne who became an honorary vice president when he retired in January as vice president and technical director of Allegheny Ludlum Steel Corporation, Pittsburgh, continues as research consultant of that organization.

Lloyd R. Cooper, acting director of Heppenstall research, has been placed in complete charge of the management of the company's newly opened research laboratory and will direct the Heppenstall research program.

◆

▶▶▶ The Holyoke Water Power Company of Holyoke, Massachusetts, announces the election of *Roy E. McCorkindale* as a director. This company operates the waterpower and hydroelectric system of the Holyoke paper mills. Mr. McCorkindale is also president of the Chase and Cooledge Company and a director of the Parsons Paper Company in Holyoke.

◆

THE KELLOGGS RETURN FROM A TRIP BY AIR AND SEA

Royal S. Kellogg, secretary-treasurer of the Newsprint Service Bureau, is back in New York after extensive travel in Caribbean waters during the winter. In addition to sailing their cruising ketch about Florida and Cuban waters, Mr. and Mrs. Kellogg took an eight-day air trip to various parts of the West Indies, including the Virgin Islands.

◆

▶▶▶ The vice president of the Robins Conveyors Division of Hewitt-Robins Incorporated, *Harold VonThaden*, is traveling abroad. While there he will visit the British General Electric Company which is a parent organization of the Frasier & Chalmers Engineering Works and the British manufacturers for Robins Conveyors. Then he will travel farther into the Continent to transact other business and engineering matters for the company in relation to coal mining. Mr. VonThaden also has been elected to membership in the Chemical, Metallurgical & Mining Society of South Africa and to the Finance Committee of the New York Engineering Society.

◆

▶▶▶ *Isaac Harter* has been elected chairman of the board of the Babcock & Wilcox Tube Company, Beaver Falls, Pa., and accordingly he has retired from his position as vice president and director of the Babcock & Wilcox Company. With the B & W Company for several years, he has been superintendent of its Barberton (Ohio) Works, superintendent of its Bayonne (N. J.) Works, and assistant to the president. The new executive vice president of the Tube company is *P. D. White, A. G. Pratt* is president, and *C. W. Middleton*, vice president.

◆

MYERS, SCHAEFER ADVANCED BY GARDNER-DENVER CO.

The former president of the Gardner-Denver Company (Quincy, Illinois), H. G. Myers became chairman of the executive board and Edgar F. Schaefer, executive vice president was elected president at the annual stockholders meeting held recently.

Edgar F. Schaefer

Mr. Myers joined the company in 1927 as chief engineer. He was made executive vice president in 1929 and was later elected president. Mr. Schaefer was formerly vice president and executive vice president.

◆

▶▶▶ The president of the Bailey Meter Company, Cleveland, announces the election of *H. M. Hammond*, former general sales manager, and *P. S. Dickey*, former chief engineer, as vice presidents. Mr. Hammond will continue to direct all sales activities of the company and Mr. Dickey will direct the engineering department and advise foreign affiliates in engineering problems.

◆

JULIAN ROTHERY RETIRES FROM FOREST SERVICE U.S.

Julian E. Rothery, who entered the forest service of the United States Department of Agriculture in July, 1908, and has been an inspector in the Division of Timber Management at Washington, retired from the service May 1.

Leaving the Forest Service in 1913, Mr. Rothery became a consulting forester in New York City and continued in private employ, mainly in the paper and pulp field, until he re-entered government service in 1935. He won international repute for his work in forest valuation and timber appraisal, and for explorations and mapping surveys in remote areas of the Labrador Peninsula, eastern Canada, Newfoundland, Alaska, and British Columbia.

◆

▶▶▶ The president of Jenkins Brothers, Alfred J. Yardley, states that the general sales manager, *C. C. Chamberlain* has been elected as a vice president of the New York office. Mr. Chamberlain also was elected to the board of directors recently.

◆

▶▶▶ At the annual meeting in New York recently, the board of directors of General American Transportation Corporation was increased from eleven to twelve members. *Walter W. Fowler*, vice president in charge of the corporation's export activities, was elected.

◆

▶▶▶ Announced by the Sun Chemical Corporation, of New York, is the election of *Charles R. Sherman* as general manager of buying for its divisions. The new secretary and treasurer of the company is *Sherwood M. Bonney*.

◆

▶▶▶ *Edward Bartsch*, president of Rayonier Incorporated, New York City, was elected chairman of the board of directors recently following the annual meeting of stockholders.

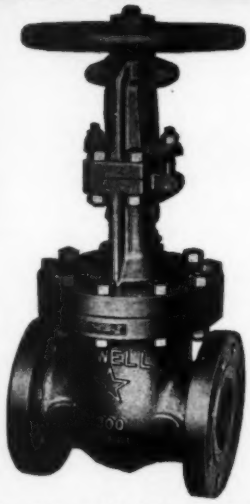
◆

▶▶▶ Secretary and treasurer of Dresser Industries, Inc., Cleveland, *Ruldoph E. Reimer* is now a vice president of the company. The new office was given to him by an election at the company's board meeting in April. Mr. Reimer has been treasurer of Dresser since 1932; he was given the office of secretary in 1943.

◆

▶▶▶ Additional duties have been given to *D. K. MacLean* by Farrel-Birmingham Company, Inc. (An-

depends on *perfect* control.



Class 300-pound Cast Steel Gate Valve with bolted flanged yoke, outside screw rising stem and taper wedge solid disc. Powell Cast Steel Valves of all types are available in pressure classes from 150 to 2500 pounds, inclusive.

Large Iron Body Bronze Mounted Gate Valve for 125 pounds W.S.P. made in sizes 2" to 30", incl. Has flanged ends, outside screw rising stem, bolted flanged yoke and taper wedge solid disc. Taper wedge double discs can be provided in sizes 2" to 12", incl. Also available in All Iron for process lines.

Small size 200-pound Bronze Globe Valve for steam, water, oil or gas. For assured, long-life performance, it has a renewable, specially heat treated stainless steel seat and regrindable, renewable, wear-resisting "Powellium" nickel-bronze, plug type disc.

The performance of an orchestra depends on the control exercised by the conductor. Without this control, the greatest aggregation of musicians in the world would make a sorry mess of the finest symphony.

Likewise, the smooth performance of an industrial plant depends on the valves which control the media necessary to its operation. And for perfect performance in flow control, the valves must be adapted in every way to the conditions under which they operate.

For more than a century, Powell Engineers have been designing valves to meet every new flow control condition as it has arisen.

Today there's a Powell Valve, in Bronze, Iron, or Cast Steel, for every known requirement of Industry. And to meet the demands of the Chemical and Process Industries for corrosion-resistant valves, Powell makes a complete line, including many special designs, in the widest range of pure metals and alloys ever used in making valves.

The Wm. Powell Company
Cincinnati 22, Ohio
DISTRIBUTORS AND STOCKS IN ALL PRINCIPAL CITIES

POWELL VALVES

sonia, Conn.). Mr. McLean will now be in charge of exports of the company's complete line of machinery. He also will continue his duties as manager of the sugar mill machinery sales department, which position he has held since 1929.

◆

▶▶▶ A release from Nopco Chemical Company (formerly National Oil Products Co.), Harrison, New Jersey, announces the appointment of Miss *Emily A. Taylor* as manager of the industrial advertising division.

◆

▶▶▶ A new position recently created by the Wheelco Instruments Company, that of vice president and director of engineering, will be filled by *Elmer Schneider*. The Chicago firm also announces *Joseph A. Reinhardt* as its new plant manager.

◆

▶▶▶ The director of public relations for Pittsburgh Plate Glass Company, *Guy Bergboff*, will now be director of all the company's advertising activities, according to a recent announcement.

◆

TWO DOW CHEMISTS RECEIVE GOLD AND SILVER MEDALS

Two medals have been presented to two research chemists of The Dow Chemical Company for their achievement in the plastics industry in 1946. A gold medal was received by Dr. John J. Grebe, director of the Dow company's physical research laboratory. A silver medal went to Robert R. Dreisbach of the Dow laboratory staff.

Both medals were presented by "The John Wesley Hyatt Award for the Advancement of Plastics," at ceremonies following a dinner at the Statler Hotel in Detroit on April 23. In addition to the gold medal, Dr. Grebe received a gift of one thousand dollars.

This award is named in honor of Hyatt, the father of the plastics industry, who developed celluloid, the first thermoplastic, in 1867. It has been presented annually since 1941.

◆

▶▶▶ At the annual meeting of the Stanley Works, New Britain, Connecticut, *Harrison C. Bristoll* was elected vice president of the company. Mr. Bristoll was former general manager of the organization's Steel Strapping Division.

◆

▶▶▶ *A. D. Robertson*, the former assistant manager of sales and engineering in Allis-Chalmers (Norwood, Ohio, plant), has been named manager of its district office in Tampa, Florida.

NECROLOGY

GEORGE CARRUTHERS

The passing of George Carruthers at his home in Toronto, Canada, on April 1, removed from the industry one of its most outstanding leaders. He was 78 years of age.

Mr. Carruthers was president and general manager of the Interlake Tissue Mills Company, Merriton, Ontario. He was a past president of the Canadian Pulp and Paper Association, and for more than a decade he was chairman of the Canadian Technical Service Council. The Interlake Tissue Mills has been a member of the Technical Association of the Pulp and Paper Industry for many years, which brought Mr. Carruthers into the activities of TAPPI.

When the textbooks on *The Manufacture of Pulp and Paper* were first published, Mr. Carruthers took a great interest in this work and he served as chairman of the Joint Textbook Committee from the early days of the organization.

Because of ill health for the past several years, Mr. Carruthers had not been attending the large association meetings. He had, however, devoted himself to the preparation of a book-length manuscript on the history of pulp and paper manufacture in Canada. This work is unpublished.

◆

HORACE A. MOSES

Widely known as a papermaker and philanthropist Horace A. Moses, chairman of the board and former president of Strathmore Paper Company, West Springfield, Massachusetts, passed away April 22. Mr. Moses passed away one day after his 85th birthday which he had observed by making a ten-year grant of $100,000 to the Junior Achievement organizations.

Mr. Moses was born on a farm in New York state. In 1881 he took a job in the office of the old Agawam Paper Company, then operated by his uncle, B. D. Rising. Seven years later, at the age of 26, he became superintendent of the mill. While working, he looked forward to starting his own business, and in March, 1892, he began construction of the original Mittineague paper mill. This mill specialized in the manufacture of new lines of rag book paper, artists' papers, fancy finishes, and other specialties. The company prospered, and in quest of another paper machine, Mr. Moses went to England and France to obtain the most advanced equipment. Construction of the second Mittineague mill was undertaken in 1901; the company then had three machines. In 1905, Mr. Moses purchased the Woronoco Paper Company.

A consolidation of all of these mills were effected in 1911 into the Strathmore Paper Company—named for a Scottish Valley whose beauty had impressed Mr. Moses during a visit. He brought the Strathmore company to the peak of its development in 1927 by the purchase of two Agawam mills of the American Writing Paper Company. One of these mills was the mill in which he had first entered the paper industry. Later, he acquired an interest in the Rising Paper Company, of Housatonic (Mass.), founded by his uncle with whom he first worked.

Aside from his business success, Mr. Moses was a leader in many local and national movements, and his philanthropies included gifts to many worthy causes.

Survivors include the widow and a daughter.

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▶▶▶ *Joseph C. Reynolds*, who was associated with West Virginia Pulp and Paper Company for thirty-three years and formerly managed its Chicago sales office, passed away the last of February in Miami, Florida. He was 69 years of age.

◆

▶▶▶ Suddenly, on April 3, *E. L. ("Bill") Berry*, vice president in charge of production of Link-Belt Company, passed away at the age of 52. During the war, Mr. Berry was vice president and general manager of the wartime subsidiary Link-Belt Ordnance Company, now dissolved. He was also a vice president and director of the Link-Belt Speeder Corporation.

◆

▶▶▶ Former superintendent of the Nashua Gummed and Coated Paper Company, Nashua, New Hampshire, and the Merrimac Paper Company, Lawrence, Massachusetts, *Walter C. Cheney*, passed away at his home in Milford, New Hampshire, on April 1. He was 71 years of age.

◆

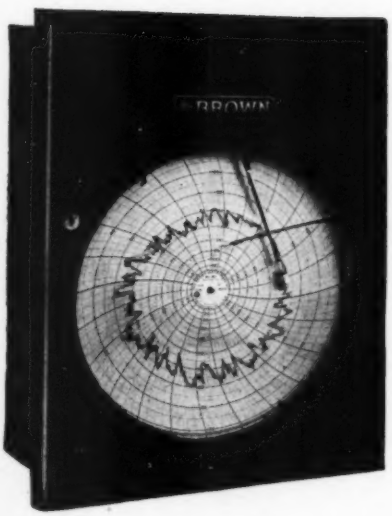
ERIK A. THOMEE

Erik A. Thomee, vice president of the Bulkley-Dunton Pulp Company, passed away March 31. Born in Helsingborg, Sweden, Mr. Thomee graduated from the Stockholm School of Economics and came to the United States in 1919.

After having been associated with several Canadian and American mills, he joined the Bulkley-Dunton Pulp Company in 1928. His thorough

grasp these savings

in FUEL DOLLARS !



Brown Electric Recording Integrating Flow Meter

STEAM ACCOUNTING LOWERS COSTS IN PAPER MILLS

Consider the savings in fuel dollars that you can make ***each day*** by just a few per cent reduction in steam consumption.

In paper mills, where steam consumption (and costs) are tremendous, the savings possible through the Brown Steam Accounting System are equally large.

Steam Accounting Systems are based on Totalizing Flow Meters. These flow meters tell you the cost of steam . . . where it is going . . . where fuel dollars are being wasted.

Before you can effectively cut down steam consumption, you must have these facts. Brown Totalizing Flow Meters give you the ***complete facts.***

Permanent two-fold records show: first, rate of flow at all times enabling you to correlate the steam load with paper production; second, the automatic planimeter pen records the amount of flow, making it possible to analyze steam usage during any period. An additional integrator dial totalizes flow.

The large savings that other paper mills are obtaining ***now*** can be effected in your plant, too.

Write for complete information. THE BROWN INSTRUMENT COMPANY, a division of Minneapolis-Honeywell Regulator Company, 4489 Wayne Avenue, Philadelphia 44, Pa. Offices in all principal cities.

TORONTO, CANADA · AMSTERDAM, HOLLAND · BRUSSELS, BELGIUM · LONDON, ENGLAND · STOCKHOLM, SWEDEN

BROWN FLOW METERS

. . . MINNEAPOLIS-HONEYWELL CONTROL SYSTEMS . . .

knowledge of the pulp business won him great renown in the trade, and in the company, and in 1938 he was appointed vice president.

Survivors include his widow, a daughter and a son.

◆

MAURICE J. MORIARTY

For nearly seventy years Maurice J. Moriarty, of South Hadley Falls, Massachusetts, was connected with the paper industry and graphic arts companies. He passed away April 10 at the age of 86.

As a boy of fifteen, Mr. Moriarty obtained a job at the Bay State Paper Company in Springfield (Mass.). Later, he became a billing clerk for the Albion Paper Company, Holyoke (Mass.). He rose through a succession of executive positions during the next 19 years until the company was absorbed in the original American Writing Paper Company. He served as manager of the Albion mill for ten years after the merger when he resigned to form his own paper jobbing business. While operating his own business he served as a representative of the International Pulp Company.

The Morart Gravure Corporation, of which he was president at the time of his passing, was formed from the Morart Paper Company, a paper finishing concern which Mr. Moriarty founded with his son, Charles F., in 1926.

◆

ELIZABETH CAHILL HOMAN

Secretary-treasurer of The Crystal Tissue Company, Middletown, Ohio, Mrs. Elizabeth Cahill Homan passed away April 17. She was one of the few women who have held positions as paper mill executives.

Mrs. Homan had been secretary of the company since it was established in 1920; she had been secretary and treasurer since 1939. In addition, she was secretary-treasurer of The Crystal Waxing Company. Her experience at Crystal and with its predecessor company totaled thirty-four years. She was active in many civic movements and was well-known in the paper industry.

◆

CHARLES HENRY BURR

Charles Henry Burr, superintendent of the Great Northern Paper Company's East Millinocket (Maine) plant, passed away on March 29. He was 74 years of age.

Mr. Burr entered the paper industry at an early age and worked in several northern New York mills. He had been connected with the Great Northern Paper Company since 1914; first as superintendent of its Madison (Maine) mill. Since 1918 he has been superintendent at East Millinocket. He is survived by his widow, three daughters and two sons.

◆

▶▶▶ Vice chairman of the board and former president of the Worthington Pump and Machinery Corporation, *Harry C. Beaver*, passed away suddenly April 2. He was 70 years of age. Mr. Beaver had been vice chairman of the board since 1944. He had been with the Worthington company since 1931 and served as president from September, 1931, until his election to the board.

◆

RICHARD H. DEMPSEY

President and general manager of the Rising Paper Company, Housatonic, Massachusetts, Richard H. Dempsey, passed away April 15. He became associated with the company in 1930, and assumed the presidency in 1943.

Mr. Dempsey had spent his entire life in the paper field, having started as an office boy with the Strathmore Paper Company, Woronoco (Mass.) directly after completing his schooling.

The widow and two sons survive.

WHY RISK
WORK STOPPAGES
DUE TO
Pump Failure?

CONTINUITY of paper production was never more important than NOW. Nothing slides down hill faster than a production record when faulty or inefficient pumps refuse to carry their load. Profits disappear... orders pile up... and labor costs mount.

Replace time-worn or obsolescent pumps with modern, performance tested Warren Pumps . . . the pump that STANDS UP LONGER with LESS MAINTENANCE, even on your toughest jobs.

Why not take some action on this problem today? Discuss your situation with a Warren Pump specialist. His suggestions will help you maintain constant, profitable production.

Write, wire or phone:

WARREN STEAM PUMP COMPANY, INC.
Warren, Massachusetts

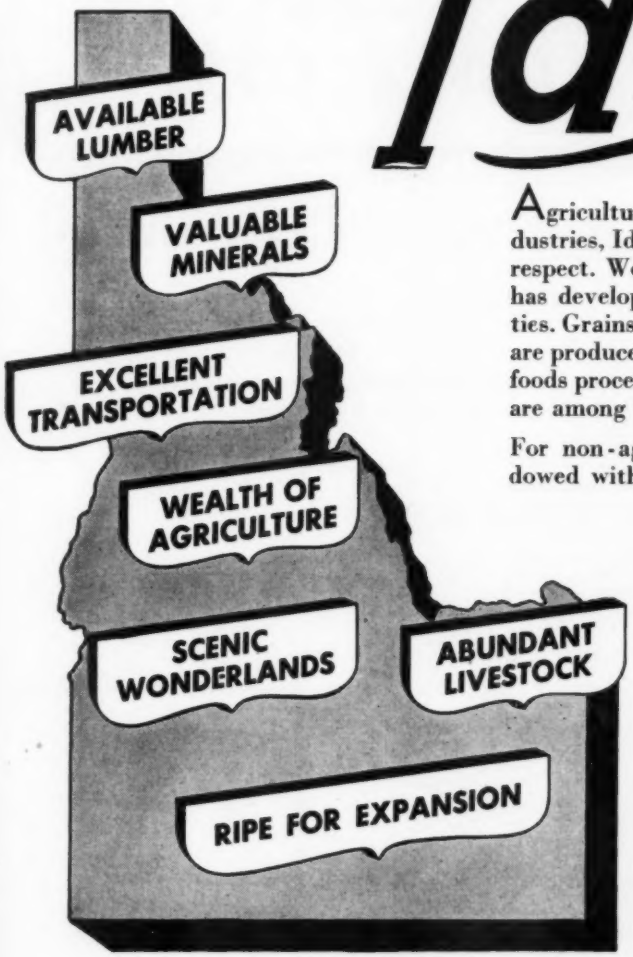
PP73½

WARREN PUMPS

UNION PACIFIC

TREASURE MAP OF INDUSTRY

Idaho*

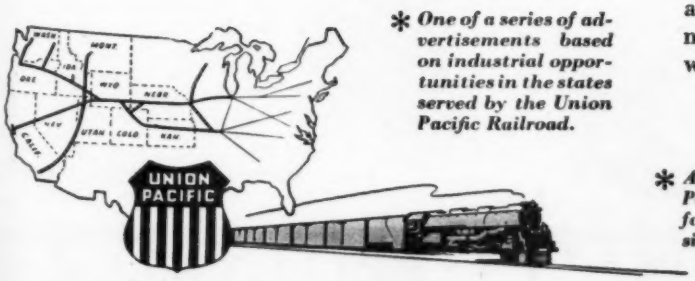


Agriculture being the life-blood of many industries, Idaho is particularly fortunate in that respect. World-famous for the Idaho potato, it has developed many other agricultural activities. Grains, vegetables, fruit... cattle and sheep are produced in abundance. Dehydration, frozen foods processing, dairying, canning and packing are among the state's flourishing industries.

For non-agricultural industries, Idaho is endowed with rich veins of minerals. Numerous manufacturers of stone, clay and glass products have established plants in Idaho. Lumber for building and wood products is available. Unsurpassed rail transportation is provided by Union Pacific.

As a vacation region, Idaho has a wonder-world of its own in Sun Valley . . . year-'round sports center... the world famous primitive area . . . and in the scenic surroundings of Payette Lake.

Idaho is a young thriving state, ripe for further industrial development. It offers good living and working conditions, good schools, splendid cultural advantages... and its energetic citizens assure newcomers of a true western welcome.



* *One of a series of advertisements based on industrial opportunities in the states served by the Union Pacific Railroad.*

* *Address Industrial Department, Union Pacific Railroad, Omaha 2, Nebraska, for information regarding industrial sites.*

UNION PACIFIC RAILROAD

THE STRATEGIC MIDDLE ROUTE

TIGHT VALVES
SPEED PRODUCTION ... LOWER COSTS!

LUNKENHEIMER VALVES STAY TIGHT WITH LESS CARE

No business can afford wasteful, costly, production-lowering valve leakage. That's why it's always *good* business to maintain a regular check on valves, to make sure they are *tight* and in proper working order . . . Maintenance men the nation over prefer Lunkenheimer Valves. They know from experience that these *quality-built* valves serve longer and better on the job—are easier to keep tight with a minimum of time, labor and expense.

ESTABLISHED 1862

THE LUNKENHEIMER CO.

"QUALITY"

CINCINNATI 14, OHIO. U. S. A.

NEW YORK 13 CHICAGO 6
BOSTON 10 PHILADELPHIA 7

EXPORT DEPT. 318-322 HUDSON ST., NEW YORK 13, N. Y.

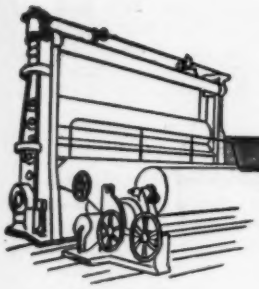
Fig. 133 "N-M-D" Globe (Non-Metallic Disc)
Fig. 2125 Bronze Gate
Fig. 1640 "King Clip" Gate
Fig. 16 "Renewo" Globe
Fig. 1630 Iron Body Gate

See Your LUNKENHEIMER DISTRIBUTOR For *Better Valve Service*

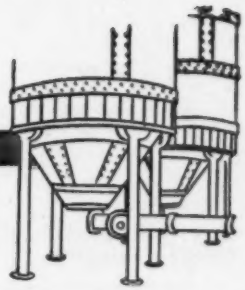
Lunkenheimer Distributors are located in principal industrial centers. There is one near you, fully equipped and ready at all times to assist with your valve maintenance, repair and operation (MRO) problems. Call on him! Ask for Lunkenheimer chart showing costs of air, steam and water valve leakage.

LUNKENHEIMER VALVES

BRONZE, IRON, STEEL AND CORROSION RESISTANT ALLOY VALVES, 125 TO 2500 LB. S. P.;
BOILER MOUNTINGS, LUBRICATING DEVICES, AIRCRAFT FITTINGS



Practical SHORTS



Readers are invited to submit short, practical articles for this department. The items should be original and should relate to ways and means of handling production and maintenance jobs. Where possible, articles should be illustrated. Rough sketches only are required. Payment will be made for acceptable items upon publication.

Pointers on Heating and Pouring Babbitt

No set rule can be laid down for heating babbitt as the work varies. Some of it is harder to pour than others and for such bearings one has to use a little more heat. All that is expected is, watch the matter of heat and try to use no more than is necessary. As a rule, for general work, the metal is too warm if on inserting a strip of paper or thin shaving, it causes same to char instantly or to blaze when put in or withdrawn from the babbitt. It is plenty warm when it barely starts them to char and does this without causing them to blaze. Mould and mandrel are too warm if they cause water to sizzle or spit and they are right when they cause it to evaporate quickly without sizzling. If these simple directions about heat are carefully followed, they will help one produce bearings with metal that has a good value for solidity.

If one pours metal dead against a stone cold metal surface, the babbitt will chill so fast that it will freeze skin deep at a time when the under metal is still liquid. Then when it sets this skin coating will not be tightly united with the under metal. In a bearing under heavy strain this loose surface metal is apt to flake off, clog the oilways and start a possible oil fault that causes a hot box. This danger is removed by prewarming the mandrel or shaft. By rubbing mandrel or shaft with chalk, or by smoking it with the flame from a torch used without the air or from burning oily waste; it will be so insulated that one can run slightly cooler babbitt and also produce a casting with a smoother running face to it.—CARBONITE METAL COMPANY, LTD.

◆

Turning the Commutator

One or more of the following corrective procedures may be employed:

(a) *Undercutting High Mica*—Depth of undercut varies with different sizes of machines, and care should be taken not to undercut too deeply. Various types of tools may be used to undercut high mica. (Figure 1). If the slots are accessible to easy cleaning, a square slot is preferable. Where the slots are likely to collect dirt, as in low-speed machines or in a dirty atmosphere, the V-shaped slot may be more satisfactory. It is well to bevel slightly the segment corners. (Figure 2)

(b) *Stoning the Commutator*—To even the surface of the commutator and to polish it, a dressing stone may be used.

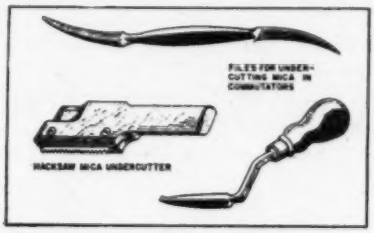


Fig. 1—Tools for undercutting mica

(Figure 3.) The stone may be held in the hands or mounted in adjustable rests. Proceed as follows:

(1) Remove all traces of oil or grease from the stone and the commutator.

(2) Lift the brushes away from the commutator.

(3) If the machine is a generator, drive it with the prime mover at normal

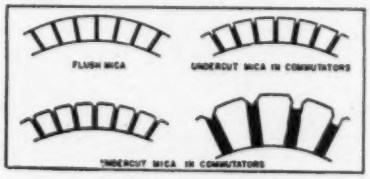


Fig. 2—Flush mica and types of undercut mica

speed; if a motor, drive it by mechanical power from some external source.

(4) Work the stone against the commutator from end to end until the surface is ground down evenly. (If the commutator is too rough or eccentric to be stoned successfully by hand, the stone can be held by a pair of clamps in a tool post, or it may be advisable to turn the commutator in a lathe.)

(5) After stoning, smooth the commutator with a very fine grade of sandpaper, and then polish it by using the back of the paper.

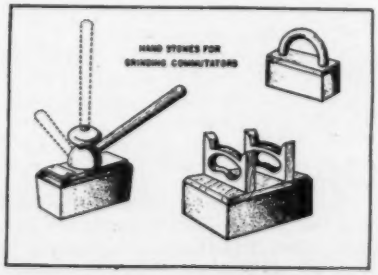


Fig. 3—Hand stones for grinding commutators

(6) Clean the commutator of every trace of copper, carbon, or dust, preferably by suction.

(7) To check on eccentricity, a dial-indicator reading of .001 on high-speed machines to several thousandths on low-speed machines may be considered normal. —*Preventive Maintenance of Electric Motors and Generators*, TM55-405, WAR DEPARTMENT TECHNICAL MANUAL.

◆

Overlubricated Bearings Are Likely to Injure Rubber Rolls

Rubber has an affinity for oil, kerosene, gasoline, naphtha, or any of the distillates. All of these are solvents of rubber and any of them will ruin a roll in short order if allowed to come in contact with it.

Oil and kerosene are the worst offenders because they are absorbed by the rubber very quickly and because they will not evaporate. Once absorbed by the rubber they cannot be gotten out of it. Like a cancer, they spread through it, softening and destroying it.

There is less danger of spoiling a hard roll than a softer one because the rubber, being denser, will not absorb oil as quickly.

If oil or kerosene are spilled onto a roll, wipe it off quickly and cover the rubber with sulphur. The sulphur will absorb the oil before it has gotten into the rubber, if quick action is taken.

The presence of oil in rubber is easily determined by laboratory test. Therefore, if you send a roll back to the factory with a claim for adjustment on account of poor service and the makers find oil in the rubber, it is a pretty safe bet that they will hesitate about allowing the claim—because the oil was not there when the roll was shipped to the mill.

The best operating results are obtained by keeping the rolls ground and properly crowned. It is best to recondition them at the first sign of corrugation or unevenness.

Keep your lever weights even. If they are removed from the front of the machine, see to it they are also removed from the rear side. Never leave a rubber covered roll resting on its surface. If you do this it will be flattened out at the line of contact. When resting, keep them in the roll box on the journal supports and with the box cover on to help eliminate the action of light on the rubber.

Finally—and *important*. No one can successfully question the worth of roller bearings on a paper machine. But, it is

possible to overload your bearings with lubricant. When too much lubricant is "shot" into a bearing, the excess travels along the journal, is picked up by the felt, and finds its way to the rubber covered roll—*utterly ruining that roll.* Watch how much lubricant you use and *don't use too much.*—THE BLACK-CLAWSON CO.

◆

How to Protect Against Volatile Solvents

Safety equipment provided for protection against volatile solvents requires regular inspection, if solvent illness and dermatitis are to be avoided. Such equipment may become ineffective through deterioration or improper handling.

Ventilating equipment, which provides basic protection against solvent vapors, may become inefficient because of an accumulation of dirt in pipes or blades, and should, therefore, be cleaned regularly. Fans and other moving parts should be inspected to see that they are in good working order, and are "pulling" the proper amount of air.

In addition to inspection of ventilating equipment, provision should be made for analysis of the vapor content of the workroom air, to be certain that it is being kept relatively free of contamination. This may be done by a competent chemist or industrial hygienist, and many states provide such service through their health or labor divisions.

Where gas masks are used, it is essential that canisters and cartridges be replaced as soon as they are depleted. The time record on canisters should be checked regularly. In addition, these masks should be tested to make certain that no odor penetrates. This may be done by having an employee who is familiar with the odor of the solvent adjust the mask, then breathe through it close to the opening of a container of the liquid.

The face mask of all respirators should be regularly examined for cleanliness and also for signs of wear, since a good canister provides no protection for a mask which permits leaks. Air lines and hose lines on respirators should be carefully examined before use.

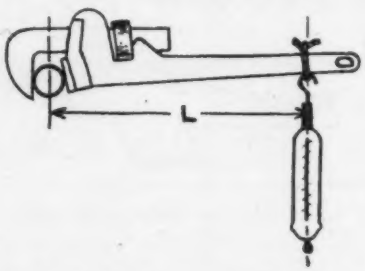
Protective clothing should be examined for cracks or tears. Pinholes in rubber or plastic gloves may be detected either by filling the gloves with water and watching the outsides for leaks, or by wetting the outsides of the gloves, inflating, and watching for the appearance of air bubbles on the wet surface. — SAFETY RESEARCH INSTITUTE.

◆

Explaining How to Do Your Own Friction Testing and Figuring

The accompanying sketch shows how easy it is to set up a testing device that can be used in a number of ways in almost any plant. Let us say, for example, that you are dissatisfied with the packing you are using on a centrifugal pump. You want to know whether or not it would pay you to discard that packing and use a brand that is advocated as superior. It is possible by means of the simple set up shown to determine whether or not a change should be made. It will tell you the cost of your present packing and the cost of a better packing—provided a better packing is obtainable.

Proceed as follows: Place a long-handled pipe wrench on the shaft, as indicated in the sketch, and at a measured distance L from the center of the shaft attach a spring scale, also as indicated. Then pull on the spring scale, causing the shaft to rotate, and note the amount of pull in pounds. The direction of pull must always be at right angles with the measured distance L. It is not necessary to rotate the shaft rapidly. Repeat the



experiment several times and note the reading on the spring scale each time until you are certain that you have the correct pull. Call it "Pull No. 1." Then remove the packing and replace it with the brand you want to try out. It is well to operate the pump for a while to make certain that the packing does not leak and that it is "worn in." In fact it would do no harm to run the pump for a week or a month so as to be perfectly fair with the new brand. Then, repeat the above test with the set up precisely as before, same distance L, same everything. Determine "Pull No 2" with the new brand of packing.

You are now ready to do the figuring. You found, for example, that "Pull No. 1" was 20 pounds and "Pull No. 2" was 10 pounds. Subtract the 10 from the 20 and you have 10 pounds difference. Multiply that difference by the distance L in inches, then by the rpm of the pump, compressor, or whatever the machine is, and multiply the product by .0000159. The result is the horsepower loss due to your present packing. To make it perfectly clear let us say, now, that the distance L is 20 inches and the rpm of the pump is 800. Applying the above rule you will have 10 x 20 x 800 x .0000159 and you will find the answer to be 2.54 horsepower, which is the loss due to excess friction of your present packing. Call it, roughly, 2½ horsepower.

It is now obvious that if a horsepower per year costs you $40 the present packing is costing you $100 per year too much or, $40 x 2½ equals $100. If a horsepower per year costs you $60 the present packing is costing you $150 per year too much. And so on.

Your problem is to select the packing that will remain tight at all times, that will operate with least pull at distance L from the center of the shaft, and that will cause minimum wear on the shaft. This very simple set up will enable you to do that in many instances. Or, a similar set up. The lever used, of course, need not necessarily be a pipe wrench. Probably you have something better than a pipe wrench, and if so, use it—W. F. SCHAPHORST, M. E.

◆

Blow-Holes in Babbitt Bearings

When blow-holes bother they are, as a rule, due to trapping air in the mould, to its being a difficult mould for air to escape from or to using a wooden mandrel.

There is air in the mould and to produce a solid casting the air has to get out. In handling an ordinary mould, the simplest way is to start the pour slowly, so as to warm and expel the air from the mould and then finish with a strong steady stream. In some intricate moulds which produce imperfections, not only of blow-holes but also of areas that frequently are as large as a walnut, they can at times be done away with by filing fine vent lines near the area, large enough to let the air escape but so small metal will not pass through.

No matter how one tries to dry out a wood mandrel, it will contain moisture and on using it the heat of the babbitt draws it out into the casting producing a porous liner. The heat conductivity of wood is very much less than that of metal, hence, its use sets up very slow cooling. It has been observed, with a wood mandrel used in casting motor bearings; and a mandrel that had been set against the fire for some hours to dry; that the babbitt cooled so slowly and so much gas was passing upward through it which had been drawn into it from the wood, that it boiled for five minutes.

If one has to use a wood mandrel, by smearing it lightly and evenly with grease, then wrapping it with a sheet of tight paper, cut to fit and pouring against that, he will keep out the blow-holes.—CARBONITE METAL COMPANY, LTD.

◆

Boiled Linseed Oil

Boiled linseed oil is made from raw linseed oil by heating it and adding certain drying compounds. The name is somewhat misleading in that the oil is not really boiled but is simply raised to a temperature sufficient to incorporate and dissolve thoroughly the drying compounds.

Boiled linseed oil is used for the same reason that a painter adds drier to paint mixed with raw linseed oil. Specifically, the use of boiled oil, on the one hand, and the addition of drier to a raw linseed oil paint on the other, are alternate methods of hastening the drying of a paint film. Both methods are in common use.

The outstanding characteristic of boiled linseed oil is its drying property. Boiled linseed oil, spread out in a thin layer on a sheet of glass, will dry in approximately twelve hours. A film of raw linseed oil, of the same thickness and with no drier added, usually requires from seventy-two to ninety-six hours to reach the same state.

Primarily because of the heat treatment which it receives during manufacture, boiled linseed oil in addition, possesses certain other qualities which distinguish

it from raw oil. The most apparent difference is in color. Raw linseed oil is a pale, straw-colored liquid. Linseed oil treated with drying compounds and heated as described has a relatively deep wine color, similar to claret. However, boiled linseed oil, like raw linseed oil, bleaches out on exposure and does not affect the color of the paint in which it is mixed.

Another change brought about by the heat treatment is in viscosity. Boiled linseed oil is slightly more viscous than raw linseed oil. While the difference is slight, it is still sufficient to influence the sealing qualities of the oil. Boiled linseed oil has long been used in priming coats for such porous surfaces as stucco and concrete.

The drying compounds incorporated in boiled linseed oil are metallic derivatives —usually oxides of manganese and lead. In order to dissolve these compounds thoroughly during manufacture, it is necessary to heat the oil to a temperature of about 500 Fahr. Oil made with these compounds and at this temperature is known as kettle-boiled linseed oil.

Although the metallic oxides require a fairly high heat before they will dissolve in raw linseed oil, other metallic compounds—notably the linoleates which are formed by lead, manganese or cobalt in combination with the fatty acids of linseed oil—will dissolve at a lower temperature. A type of boiled oil is often made from these compounds and is known as pale boiled oil. As its name implies, it does not have the deep wine color of a kettle-boiled oil. Also, because it is made at a lower temperature, it does not have the "bodied" characteristic and, therefore, the sealing qualities of the latter.—DUTCH BOY QUARTERLY, Vol. 15, No. 4

◆

Cleaning Motor and Generator Windings

Dirt will accumulate in spite of all precautions and must be removed periodically. This is particularly true of open machines. Dirt also enters enclosed motors and generators. In either case carbon and copper dust is deposited as a result of commutator wear. Oil vapor or leakage clings to windings and greatly increases accumulations of dirt, creating layers that block off ventilation and lead to overheating. Certain types of dusts have special effects:

(1) Conducting dusts shorten creepage distance and penetrate windings, causing short circuits and grounds.

(2) Hard, sharp dusts cut into insulation and shorten its useful life.

(3) Cast-iron dust is magnetic and is agitated by stray fields.

The method of cleaning will depend upon the nature of the accumulation. In all cases, however, care must be taken to avoid using anything which may injure the insulation. For this reason soap and water, wire brushes, and metal scrapers are not to be used. Cotton waste should not be used because thread and lint will accumulate and will collect new dirt.

(1) Light dusts can be blown out with low-pressure, dry air. (The air pressure at the nozzle should not exceed 15 to 25 pounds per square inch. Excessive pressure may cause damage to windings.) Grit, iron dust, carbon dust, and copper dust should be removed by suction. Hose tips for either pressure or suction should not be of metal.

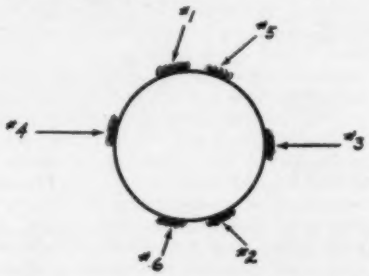
(2) Grease and oil can be removed by the conservative use of a solvent such as carbon tetrachloride, which evaporates quickly. (Gasoline and benzine are noncorrosive solvents but constitute a fire hazard.) The vapor of carbon tetrachloride has toxic effects, however, and good ventilation must be present when this solvent is used. After cleaning, dirt should be blown out. If the accumulation is excessive, this process must be repeated several times. However, care should be taken to use the solvent sparingly. It may soak into inaccessible places and evaporation may be delayed long enough to soften and harm insulation.—*Preventive Maintenance of Electric Motors and Generators*, TM55-405, WAR DEPARTMENT TECHNICAL MANUAL.

◆

Worn Paper Mill Shaft Repaired by Arc Welding

Welder in accompanying illustration is building up a worn 4-inch shaft on a revolving paper mill screen which is 36½

inches in diameter and over 6 feet long. The shaft itself is 8 feet in length. Using an electrode especially designed for arc welding mild steel in any position, the welder applies beads in the sequence



shown in the sketch to avoid warping. Building up the shaft required two hours and turning it down to proper size was accomplished in even less time.—THE LINCOLN ELECTRIC COMPANY.

◆

Practical Pointers About Stationary Scaffolds

Among the chief causes for stationary scaffold accidents are:

(a) Low grade or defective materials
(b) Improper construction
(c) Lack of substantial foundation
(d) Ignorance of the manner in which stresses such as tension, compression and shear are transmitted to the various parts of the scaffold.
(e) Absence of diagonal bracing
(f) Use of projecting scaffold planks which tip when stepped on
(g) False economy in the use of material because of the temporary nature of the scaffold
(h) Setting of the scaffold on a hollow sidewalk without adequate bracing below
(i) Overloading
(j) Use of the scaffold for purposes other than that for which it was built

All materials for scaffolds should be inspected carefully as to suitability before being set in place. After a scaffold is erected, it should be inspected for defects at frequent regular intervals. Should defects be found, they should be reported in detail to the proper persons, and the scaffold kept out of service until the defects have been corrected.

Scaffolds should not be used to support too many workmen at one time, nor should a scaffold be required to support the weight of too heavy equipment.

If the foundation of one or more of the scaffold supports settles, the scaffold should not be used until it is repaired.

Scaffolds should be reached by stairways, ladders, or some other safe means of access. Boxes, barrels or similar unstable objects should not be used.

If the floor of the scaffold is elevated more than five feet above the normal working level (floor or ground), the standard guard rail should be installed along the sides and ends. Standard toeboards should be provided to prevent materials and tools from falling off.

Finally, scaffolds should be erected and dismantled only by experienced men.—NATIONAL LEAD COMPANY.

◆

Finishing a Babbitted Bearing

Excess babbitt should be removed and all lubrication holes should be thoroughly cleaned. The bearing should be carefully fitted to the shaft. Best results are obtained by boring and scraping to a final fit, using Prussian blue to find the high spots. In order to provide thorough lubrication, oil grooves should be added. These distribute the oil properly and at the same time collect the oil, which would otherwise run out at the ends of the bearings, and return it to some point where it may be reused. It is obvious that the grooves should not extend all the way to the edge of the bearing.

Lubrication engineers claim that the best location for grooves is in the low pressure areas near the entering side of the high pressure area. Grooves should be shallow, with well-rounded edges. Sharp edges scrape the oil from the shaft. Avoid too many or too large grooves. They tend to break the oil film and reduce the effective bearing area.

Split bearings should also be chamfered on each edge. Often, this is all that is needed in the case of high speed bearings.—MAGNOLIA METAL COMPANY.

Balances—Ancient and Modern*

G. S. CLAYSON
Wm. Ainsworth & Sons, Inc.

The equal arm balance was the first type weighing device to be used. It ranks high among the earliest mechanisms used by man. Stone axes were earlier predecessors in the inventory of man's tools, but the balance, like the stone ax, was fundamentally correct as five thousand years of use has proved. It is interesting to consider that the difference between the Egyptian balance of 3000 B.C. and the precision balances of today is only improvement, refinement and the proper use of better materials and workmanship.

Paintings found in Egyptian tombs show the use of equal arm balances as early as 3500 B.C. In so far as is known, no actual balances or parts of balances, proved to be of that early date, have been preserved but units of mass (weights) used with them have survived. The earliest balances and stone weights were used in weighing gold and silver for the Egyptian kings. We have adequate proof of their age. Later, weights made of stone were used to weigh rations of corn, grain, fish and other edibles handed out to slave laborers. Many of the stone weights were marked to indicate their use, having a fish, an ox head or other symbol chiseled into the surface. In later centuries, as weighing became more common, weights were cast of copper alloys, some in the form of animal heads, etc.

The Egyptians developed fairly accurate tools for weighing but accuracy of balances declined during the rise of the Roman Empire. Equal arm balances were discarded to a large extent in favor of more ornate, but less accurate, steelyards or equal lever mechanisms.

It can be assumed from the meager information available that the early Egyptian balances could obtain an accuracy of one part in one hundred. Present day chemists take for granted that the poorest balances will give results accurate to one part in twenty thousand and the average fine balance will be accurate to one part in one hundred thousand. Many balances produced currently are accurate to two in one million (equal arm ratio error) and will reproduce weighings with one part in twenty million.

At this point, an explanation is in order in regard to over-all accuracy and sensitivity. Over-all accuracy in weighing is a summation of all errors; mechanical, human and intangible.

The accuracy of balance beams has always been far ahead of the accuracy of contemporary machine tools. It may be assumed that the Egyptian balance maker secured fair accuracy in his balance by the "cut and try" method. Thus we find him making serviceable weighing apparatus with the crudest tools.

As manufacturing aids improved, our ancient balance maker could produce his product easier, but the demand for higher accuracy in the balance exceeded the improvement in tools. He had to continue to use his knowledge and hand skill to obtain the final result. This process has continued to the present day. Modern balance makers are still producing balances which are far more accurate than most of the tools with which they are made.

The extreme precision of adjustment of balance knife edges has never been successfully accomplished by a machine. The finest balances are still adjusted by hand methods. As an example, certain classes of modern machine tools will do work to a tolerance of .0001 inch and in isolated cases even closer. Such a tolerance on the arm ratio of a balance beam would be crude, since it is common practice to work with a tolerance of .000006 inch and less (six inch beam analytical). The present day student balance of 1/10 mg. sensitivity must be accurate to less than twenty parts per million or less than .00006 inch on a six inch beam.

Any discussion of balance accuracy (beam accuracy) suggests the question of beam lengths. Ultimate accuracy in weighing is dependent upon the equality of the beam arms (other factors being equal); the longer the beam, the easier it is to obtain a given precision. This explains the extremely long beams found on earlier balances. Balances having ten inch beams are still in use, particularly assay balances which were the earliest form of truly precise balances. On a beam of ten inch length the tolerance mentioned in another paragraph, of .000006 inch, would be increased to .00001 inch and give the same precision in weighing with the same load. The most serious objection to a long beam is its slowness or period of oscillation.

Other factors enter into the period of oscillation of a balance beam, such as the weight of the complete moving system, the degree of sensitivity and the load carried in the pans but, all other factors being equal, the shorter the beam the more rapidly it will move. In modern balances, particularly analytical balances, the beam length is governed by the necessity of providing adequate space in the hangers for the load. Where the volume of the load is not a problem, one would assume that the beam could be shortened indefinitely with beneficial results. This is true only within certain limits, since a very short beam introduces mechanical trouble and instability which are not offset by its increased speed. In so far as is known, the shortest beam offered for field use was approximately three and one-half inches. American manufacturers apparently have concluded that micro and other light capacity balances should have a beam length of from four to five inches.

The art of producing bearings suitable for fine balances is an interesting phase of balance manufacture. Agate, the material most commonly used, was prized in the eleventh century for use in charms, which were supposed to make the wearer have an agreeable disposition; make him prudent; keep out demons and prevent drunkenness. In the sixteenth century agate was used in India for many purposes among which were charms, jewelry and coins. During this period, it was the law of the land that weights be made of agate.

Agate is chemically identical to quartz, both being composed of silicon. The former is, however, somewhat harder and unlike natural quartz, it has no definite lines of cleavage. Mineralogists state the pores of agate are only one fifty millionth of a millimeter in diameter. For all practical purposes it is a hard, homogenous, tough material.

The best source at present, of high quality agate in commercial quantities, is Brazil. Various substitutes for agate have been suggested and tried as balance bearings, but it still holds the topmost position over all other materials. The use of agate for balance bearings will probably continue, since it has great advantages of performance and economy.

The manufacture of balance bearings begins with the selection of the proper grade of agate as to structure, hardness and freedom from flaws. Almost without exception "geodes" or boulders are hollow, some having only a tiny hole near the center, while others have a cavity as large in proportion to their size as the seed cavity in a cantaloupe. The center space in the geode is invariably lined with quartz crystals which makes sawing more difficult than if the pieces were solid. Selection is accomplished by "sampling" each geode. A slab is cut from the stone and a small piece of this slab is ground and polished to prepare it for inspection. The sample, and the stone from which it was taken, are numbered so that several samples may be considered during one "set-up." The polish obtainable on a given sample is inspected visually with the aid of reflected sunlight. Hardness and brittleness are determined by careful study of microscopic lines cut into the polished surface by a diamond tool.

Harder and more brittle stones usually take the highest degree of polish and are ideal for flat planes while stones showing little tendency to chip are selected for knife edges. Balances having bearings which are produced without these precautions will show grooved planes and chipped knife edges after a comparatively short period.

After proper selection and grading, the agate is sawed into slabs with metal "saws" impregnated with diamond particles. The slabs are, in turn, sawed into the appropriate shape for grinding triangles and rectangles. Grinding of the agate parts is followed by polishing those surfaces necessary for performance or appearance.

All surfaces of triangular knife edges are polished. This prevents accumulation of foreign material, facilitates assembling the edges in the beam and presents a "finished appearance." Fine grinding and careful polishing of the final sharp edge is the last step in finishing the knife edge before it is pressed into place.

Only one surface is polished on the agate planes but this polishing must be rigidly controlled to produce an opti-

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cally flat area. One "interference band" of curvature per inch of surface is the maximum tolerance allowable for superior performance and long service.

Other phases of balance making include many machine shop practices on a miniature scale, a broad knowledge of finishing procedure, some metallurgy, simple chemistry and other skills.

Like the ancient Egyptian balances, today's balances are useless without suitable weights; thus the balance maker must operate a dual business, maintaining standards of mass and calibrating laboratories. He is required to produce weights of aluminum, tantalum, nickel, platinum, gold, brass, bronze and stainless materials —the latter materials requiring meticulous care in selection of material and in final finshing.

Most balance users are familiar with keyboard operated weight carriers, chain weighing attachments, magnetic and air damping and various devices for magnifying or amplifying deflection or movement of the balance index. All of the weighing aids are of value in most cases where they are used, except possibly dampening.

If dampening is not thoroughly understood, it may not be the answer to the problems of speed or accuracy. The highest accuracy of a balance is sacrificed to some degree when it is dampened. On the other hand, dampening is indispensable on direct reading balances and is very useful in many cases on other balances. The conclusion, therefore, is to know your problem and use dampening only when it is of benefit

The American Chemical Society

(Reported by Louis E. Wise)

▶▶▶ PROMINENT SPEAKERS addressed the 111th meeting of the American Chemical Society held at Convention Hall in Atlantic City, April 14-18. The general tone and common thread was that of international co-operation in science. It is a good theme and one to which other societies might very well give heed. Thus, Lawrence Duggan, director of the Institute of International Education, and formerly a division chief in the State Department, spoke on "International Educational Exchange—A Laboratory Experiment in Human Relations." Ralph H. Allee, director of the Inter-American Institute of Agricultural Sciences, at Turrialba, Costa Rica, spoke on "Science and Agriculture in Inter-American Affairs." Mr. Allee, who has served the United Nations, has been honored by Ecuador and by Albania. He is an agronomist who introduced modern agricultural methods into Central and South America. Dr. George N. Shuster, president of Hunter College, spoke on "Can UNESCO Succeed?" He is a long range expert on international affairs. Another famous speaker was my old friend and teacher, Marston Taylor Bogert, professor emeritus of organic chemistry at Columbia University, who is now president of the International Union of Chemistry. His subject entailed the "Rebuilding and Advance of the International Union of Chemistry." The seventeen divisions of the Society held individual meetings or symposia at which several groups collaborated. Hundreds of papers were read and discussed. This brief survey will refer only to those articles which have a direct or indirect bearing on the pulp and paper industry or on allied industries and even these will be given only in abstract form.

Before the *Division of Agricultural and Food Chemistry*, Elwin E. Harris, Martha L. Hannan and Ralph R. Marquardt, of the Forest Products Laboratory, discussed the *nutrient requirements in the production of food yeast from wood hydrolyzates*. For example, Douglas fir when hydrolyzed has few of the requirements for yeast production excepting the sugar. The nitrogen, potassium, and phosphate requirements were explored. Per 100 pounds of reducing sugar, these requirements were respectively 3.2 pounds of nitrogen, 1.5 pounds phosphoric pentoxide, and 1 pound potassium chloride. The addition of magnesium sulphate did not change the rate of growth or yield of yeast.

A number of interesting papers were presented before the *Division of Cellulose Chemistry*. D. Price, of the Hercules Powder Company, spoke on the *Composition of Rosin Size Precipitates*, with special reference to the analysis of standard precipitates. In contrast to other solvents, petroleum ether did not alter the composition of fresh rosin size precipitates even in the presence of an excess of water. These fresh precipitates contained little or no oxidized resin acids (insoluble in petroleum ether). For this reason, the solvent was used to study the composition of rosin size precipitates. Such extraction permitted the isolation of an "aluminum diresinate" both from laboratory preparations of the rosin size precipitate, as well as from rosin-sized paper. In the analysis, Price used the carbon aluminum ratio (rather than the usual ash determination alone). The sizes studied contained zero, 20, and 75 per cent free rosin. Drs. C. R. Fordyce and D. R. Simonsen (of the Eastman Kodak Company) studied the *Evaporation of Cellulose Ester Solutions in Binary Solvent Mixtures*. Solutions of cellulose derivatives in mixtures of organic solvents are frequently used technologically, and an understanding of the evaporation mechanism of such mixtures is important in controlling the properties of surface coatings. Whereas solvent mixtures (in the absence of cellulose esters) evaporated primarily according to ordinary vapor pressure characteristics during exposure to ordinary atmospheric conditions, this was frequently not the case when cellulose esters were present. This difference in behavior showed selective retention of certain solvents.

A method for the isolation of hemicelluloses directly from wood (by 20 per cent caustic potash extraction at 65-70 C. for 2 hours) was reported by S. C. Rogers, R. L. Mitchell, and George J. Ritter of the Forest Products Laboratory. Harris and Land (of the same laboratory) reported on the *hydrolysis of wood cellulose and the decomposition of sugar with dilute phosphoric acid* (0.2-3.2 per cent) at temperatures of 179-194 C. over varying time periods. The rates of cellulose hydrolysis and sugar degradation followed first order reactions, the decomposition of the sugar being more rapid than the hydrolysis of the cellulose.

The *synthesis of disulfide cross linkages in polyvinyl alcohol and cellulose derivatives* was described by E. F. Izard and P. W. Morgan of the Rayon Department of E. I. duPont de Nemours and Company (Buffalo, New York). As a tool for studying the chemical modification of fibers, A. M. Sookne and Milton Harris (of the Harris Research Laboratories) made *single fiber load-elongation measurements*. This method offers advantages over the usual measurements on fabrics and yarns because the properties are not complicated by the effect of fabric or yarn structure. The authors described an apparatus for such measurements, and showed the interesting and profound effect of the chemical treatment of viscose rayon fibers, especially when these are wet. Although their results do not prove that cross-linkages occur, Sookne and Harris showed that their data are in harmony with a cross-linked tridimensional network. From the same laboratory, Eleanor Davis, H. A. Rutherford, W. E. C. Yelland, and M. Harris reported that by exposure to *natural out-of-door weathering microbiological attack on cotton fabrics was appreciably retarded*. Permanent resistance to mildew, however, was not achieved. The phenomenon is interesting because it appears coupled with certain chemical changes. For example, in gray cotton duck, the acid carboxyl content decreased (indicating a loss of pectic material). Effects similar to weathering were obtained in the laboratory by exposure to ultraviolet light. Sufficient evidence has not been gained to exclude other agents (besides ultraviolet light).

Messrs. J. W. Rowen and R. L. Blaine studied the *sorption of water by various polymeric textile materials*. The isothermal sorption of water vapor and nitrogen by these fibrous materials (and by TiO_2) were determined at 25 C. and at minus 195.8 C. The surface areas available to the two gases was calculated and the specific free energies of adsorption of the two gases on the fibers were also calculated. The surface areas available to water vapor are 145-200 times greater than those available to nitrogen. The results are quite compatible with the idea that uptake of water by fibers is an adsorption process.

The *Division of Chemical Education* held an interesting symposium on the *Professional and Economic Status of the Chemist*. This involved a discussion of

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desirable attributes in professionally trained men, the employer-employee relationships for such individuals, the profession of chemistry, and a summary of the results of the licensing-registration-certification poll (a survey ordered by the Council of the American Chemical Society and carried out by the Society's Committee on Professional and Economic Status). This survey included the views of members in the position of the chemist and chemical engineer in the social and professional heirarchy as indicated by sex, age, experience, education, type of employment, current income, location, etc. Men who took part in the symposium included Dr. Albert Elder (Corn Products Refining Company); Dr. H. Wade Rinehard (DuPont); Dr. C. W. Ransom (General Electric Company); Dr. J. J. Healy, Jr. (Monsanto Chemical Company); Dr. Foster D. Snell, and Dr. K. B. Fleer. This same division (acting jointly with the Division of Petroleum Chemistry) held a live symposium on the *Preparation of Literature and Patent Surveys.*

In this connection, an interesting paper was presented by John C. Lane and John Metsch on the *continuous collection and classification of data as an aid to preparing surveys.* Their scheme consists of the continuous collection, classification and filing of current literature and patents. As a result, surveys may be prepared at minimal expense directly from filed material without searches of the abstract journals. Stenographic personnel can do most of the work, thus conserving the time of technical personnel. Others taking part in this (and a related symposium on *Petroleum Information Service*) were M. P. Doss (Texas Company); Gertrude A. Munafo (Texaco Development Corporation); D. F. Brown (Chief Librarian, Standard Oil Development Company); Thelma Hoffman, C. C. Miller, I. B. Wallace and E. L. D'Ouville (Standard Oil Company of Indiana); H. M. Smith, R. M. Gooding and John S. Ball (United States Bureau of Mines), and Frederick D. Rossini (National Bureau of Standards).

The Division of Chemical Education also had a spirited symposium on *Chemical literature,* its classification, patents, abstracts, *et al.* F. W. Cochran, of the United States Patent Office in Washington, D. C., reported their key to system of classification (with 320 classes and 43 thousand subclasses in their manual). The streamlining of their system by the use of punched cards was explained.

Another symposium, within the framework of the Division of Chemical Education was one on *Revision of Chemistry and Chemical Engineering Curricula* in our colleges and universities. Participants in this came from the following colleges and universities: Michigan State, Bard, Duquesne, Oberlin, Illinois, and Minnesota. Industry was represented by H. W. Rinehart of the duPont Company, and Walter J. Murphy, editor of *Industrial and Engineering Chemistry* also spoke his piece. The faults and weaknesses of present curricula were discussed frankly, and summaries of opinions (especially regarding the Ph. D. degree) were presented.

Under the chairmanship of Dean Harry F. Lewis (The Institute of Paper Chemistry) a symposium on the *design and construction of college and university laboratories* was held. One of the features of this group meeting was a discussion of laboratory design for chemical engineering instruction by H. C. Weber, of Massachusetts Institute of Technology, who gave, in detail, the construction of a building designed for maximum utility and flexibility at minimum cost, which could accommodate 60-90 undergraduates and 100-150 graduate students. Space for pilot plant work and unit operations was provided. Cumulation of obsolete equipment is to be prevented by keeping permanently installed units at a minimum. An architect (H. R. Dowswell) also entered the round-table discussion.

In the *Division of Colloid Chemistry,* after a series of stimulating papers, there was a round-table discussion of fundamental physical measurements on inorganic pigments. In the *Division of the History of Chemistry,* another discussion had as its subject *The Impact of Chemistry on World History.*

The *Division of Industrial and Engineering Chemistry* (with Dr. Charles E. Reed, General Electric Company, presiding) held a *symposium on organic silicon compounds,* with some twelve papers, several of which were of interest to the pulp and paper industry. Dr. C. S. Miner, Jr., and L. A. Bryan (of the Miner Laboratories in Chicago), R. P. Holysz (Northwestern University), and G. W. Pedlow, Jr. (of the General Aniline and Film Corporation) gave a joint paper on tertiary alkoxy-amino silanes. The prep-

aration of intermediates from tertiary alcohols with silicon tetrachloride was described, and these compounds (like di-tert-butoxydichloro-silane) were then allowed to react with ammonia to give the corresponding diamino silane. An important use of these *amino-silanes* depends on the fact that they react with water (or alcohols) to split off ammonia and on heating to give a hydrophobic resin. Almost any surface treated with such an amino-silane and heat cured becomes water-repellant. Among others, textiles and paper have been treated successfully in this way. J. R. Patterson (General Electric) described the use of silicone resins in protective and decorative coatings. These resins are compatible with many other organic resins and high polymers and retain their color and gloss at high temperatures, their flexibility at low temperatures, and are resistant to heat, aqueous acids, and alkalis and weathering.

This Division together with the *Division of Analytical Chemistry* also held a symposium on *Statistical Methods in Experimental and Industrial Research*. The *Divisions of Cellulose, Colloid, Organic, Physical, Rubber,* and *Paint, Varnish* and *Plastics Chemistry* joined in another *forum on high polymers*. Whereas this was an exceedingly important series of papers with the internationally famous Dr. P. Debye presiding, few of them had more than an indirect bearing in the pulp and paper industry. An interesting paper by Drs. V. J. Trilette and H. Mark dealt with the *rate of exchange of cellulose with "heavy water"* (D_2O). It was found that when dry cellulose was placed in heavy water, a part of the hydrogen in its hydroxyl groups was very rapidly exchanged for deuterium. However, the process rapidly slowed down, and it is possible that the easily accessible hydrogens (in the amorphous regions, and on the surface of the crystalline regions of the cellulose) are the ones replaced. In the inner crystalline regions such exchange probably takes place very slowly or not at all.

Another paper of importance and possibly of indirect interest to cellulose chemists was that of P. Debye and A. M. Bueche (Cornell University) on the *sedimentation and diffusion constants of polymers*. Expressions for such constants were developed by a method similar to that used for the calculation of intrinsic viscosity and takes into account the effects on the liquid flow around a group in the molecule, of disturbances caused by all other groups. From measurements of viscosity and diffusion or sedimentation in combination with measurements of the size (derived from dissymmetry of light scattering) it may in the future be possible to estimate the amount of cross-linking or branching in polymers.

Before the *Paint, Varnish and Plastics Division*, Messrs. W. E. Weaver and W. M. Whaley of the Naval Research Laboratory in Washington reported preliminarily on the relationship between chemical structure and fungicidal activity. Amines and carbonyl containing compounds were often fairly toxic to fungi. Of all the groups considered, only the halogens could be advantageously polysubstituted

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in the molecule. The work is being extended on a more quantitative basis, which might have a direct bearing on the future industrial uses of fungicides (as in paper mills). Allyl-modified rosin esters were described by F. A. Hessel and John B. Rust (of the Montclair Research Corp.) and W. B. Canfield (of the Ellis-Foster Co., Inc.).

In the *Division of Petroleum Chemistry*, the spectrophotometric evaluation of lubricating oils was outlined by G. L. Clark and K. J. Pipenberg (of the University of Illinois) and T. W. Culmer (of the Ohio Oil Co.). Evidently performance predictions can be made on the basis of spectrophotometric curves. Several interesting papers presented before this and other divisions dealt with the uses and applications of the mass spectrometer.

Before the *Division of Physical and Inorganic Chemistry*, F. R. Senti, and L. P. Witnauer (of the Eastern Regional Laboratory, Dept. of Agriculture) presented the results of their work on the structure of *alkali amyloses* of starch. The materials had been prepared by taking amylose triacetate and deacetylating it with alcoholic solutions of lithium, sodium, potassium and caesium hydroxides. The compounds that resulted gave excellent X-ray fiber diagrams, all of which indicated orthorhombic cells, the dimensions of which were all very similar. The compounds appear to have the general composition: $(C_6H_{10}O_5)_3 \cdot (H_2O)_2 \cdot MOH$ (where M is the metal).

The *Division of Sugar Chemistry and Technology* held a program in commemoration of Max R. Goepp, the brilliant young chemist who was killed in an airplane crash some months ago, and whose tragic death deprived this country of a creative and imaginative mind. This same division had the benefit of two papers dealing with the polysaccharides of the endosperm mucilages, which have within the past two years led to such new and interesting developments in the pulp and paper industry. These are all *mannogalactans* and they serve to improve paper strength and sheet formation. One of them, guar seed mucilage, has been studied intensively at the Institute of Paper Chemistry, and is now grown extensively in the United States. At this meeting, Eillen Heyne and Roy L. Whistler (reporting from the Textile Foundation of Bethesda, Md.), described the chemical composition and the polymolecularity of this guar polysaccharide. The ground endosperm could readily be separated into a water-insoluble fraction and a water soluble portion, the latter representing about 85%. The butyrates and acetates of this water soluble fraction were prepared and were found to give strong, pliable films, giving evidence of linear molecules. The high specific rotation indicated the predominance of alpha-glycosidic linkages. The aqueous solution of the original gum was fractionated by the gradual addition of alcohol, and the physicochemical properties of these fractions were studied.

A contribution in the same general field was made by O. E. Moe, Sidney E. Miller and Marjorie H. Iwen (of General Mills, Inc., who have been doing excellent development work with the mannogalactans). The *endosperm mucilages of carob, honey locust, and guar* were subjected to periodate oxidation. Each of these consumed one mol of oxidant per hexose unit and the resulting polymeric dialdehydes obtained as cleavage products gave rise to 18-24 per cent glyoxal. The chemists interpret these results as indicating that 1-4-linkages are present in the original polysaccharide—which is out of harmony with data previously published in the case of carob and honey locust mucilage, both of which can also be used in papermaking. The sensitivity of these mucilages to irreversible gel formation with borates may be due to the cis-glycol group found in positions 2 and 3 in the mannose units of the mannogalactans.

The Division of Water, Sewage, and Sanitation held a stimulating and timely symposium on *industrial wastes*. This meeting also was attended by members of the Industrial and Engineering Group. Participants in the discussion included a large number of men prominent in educational bodies, public utilities, industrial plants and health agencies. One of these, L. F. Warrick, of the Wisconsin Board of Health, spoke on *stream improvement and the pulp and paper industry*. After giving a historical resume which showed the trend toward extensive mill studies, Mr. Warrick discussed mill effluents which he classed very broadly as (1) white water (fiber) wastes, and (2) chemical pulping wastes. Characteristics of each class were described together with the effects on the streams into which they were being discharged. Stream improvement could be attained either by utilization or the effluents and/or by their treatment and disposal. Save-all and recirculation systems for white water wastes were outlined. In many cases, the savings effected by white water utilization more than justified the costs of the recovery system. Reduction in stock losses through mill improvements were cited. From the standpoint of stream pollution, sulphite waste liquors are still the most serious. They are also the most difficult to utilize effectively, or to treat and dispose of economically. Mr. Warrick outlined the research and development work in this field. In certain cases by-products might offset the costs of treatment. However the expenditures entailed in taking care of mill wastes so as to prevent pollution are (in Mr. Warrick's opinion) to be recognized as an essential part of production costs.

From this brief survey, it will be noted that the meeting was replete with important symposia. The trend is in this direction, because at these meetings, various viewpoints can be presented critically and frankly and subjects can be broadly discussed. Inasmuch as even the brief abstracts of the meeting filled a book of well over 300 pages, it is evident that the foregoing summary is far from complete. However, it may serve to acquaint the reader with the gist of those papers that had some bearing on our industry.

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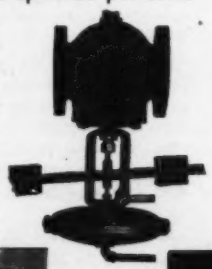

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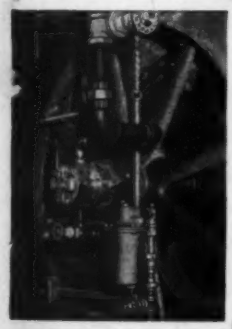

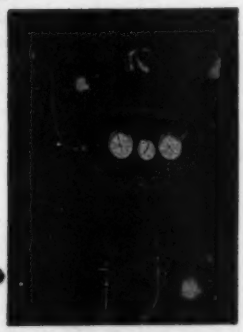

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Convention Papers . . . Abridged

Abridgments in this section are from papers presented at the annual meeting of **The American Pulp and Paper Mill Superintendents Association**, held in Poland Spring, Maine, June 17-20, 1946.

Your Part in Lithography's Future

W. E. GRISWOLD, Executive Director Lithographic Technical Foundation, Inc.

The business of putting ink on paper as a means of channelling information and ideas to the public is a great business—an important part of the American economic system that built this country.

With the whole ink-on-paper industry facing the urgent necessity of improved end-use value rather than cost per pound or per thousand pieces of printed material better guides are needed. Many well-informed lithographers are sure that not enough fundamental or even advanced experimental research is carried on by paper mills collectively or individually to insure development of coated papers to meet the real, the special, and the potential needs and opportunities of the present and changing market of the lithographers. Many feel there is insufficient knowledge and recognition of the peculiar differences of the lithographic process among paper research and production men.

I told key men in lithographic plants, some research and technical men, I wanted the information to pass on to you just as if each one had the privilege of standing before you and saying what he thought you could do as your part in the promising future of the lithographic industry—particularly as to coated papers.

I give you here first the substance of one communication. The writer, who is general manager of a straight litho plant, lists four items which he believes should be presented to you.

"1. Coating and its effect on ink drying; his first comment:

"Some coatings have a retarding effect on the drying time of inks; still other coatings promote chalking by causing an unusually large absorption of the vehicle. There certainly is much to be done with regard to the compatibility of inks and coatings." Perhaps he means you should be just as interested in studies of ink receptivities and the lithographing qualities of pigments as in caseins, resins, waterproofing, starch, grain, etc.

"2. Resistance to picking; his second point:

"Efforts should be continued along the lines of improving coatings to the point where fairly large solids can be printed with inks of above average tack, and without picking. Certainly practical and readily available means of measuring tack and length of ink would be needed here.

"It has been our experience in checking deliveries of coated paper that very often coatings would pick under a #5 wax test, and other deliveries will stand up under a wax test as high as #12. Results have shown that we can obtain satisfactory results by offset printing on coating that will stand at least a #8 wax test. Anything above that is just an extra safeguard but is not necessary, and anything below #8 causes considerable difficulty.

"3. Absorption of ink should be uniform:

"Ink penetration still is not as uniform as it should be. This is due to the calendering operation which evens the surface of the paper, but causes spotty or uneven absorption of ink.

"4. Scumming:

"In many cases we have found that coated paper has caused scumming, and we are advised by our Laboratory that the cause of this is that the *p*H of the coating is on the alkaline side. This changes the *p*H value of the fountain solution and necessitates constant checking and regulation.

"We wonder if it would be possible to have the paper industry create a standard to eliminate this difficulty. Tremendous time is lost in the pressroom in overcoming a condition of this type." Okay, but doesn't there need to be more accurate knowledge of the *p*H of fountain solutions, a more general use of *p*H control than obtains, and process standards adjusted to paper standards?

Here's another:

"I have discussed the matter of coated papers for lithography with a number of our people and we feel that an all-purpose coated one and two sides sheet for offset lithography should be developed for our industry . . . not a sheet that can be used for letterpress printing as well and that will just get by for offset lithography, but a sheet that will not pick so that we get our full color value and good varnishing results. We believe this would be possible if the surface were sacrificed a little.

"Our experience has proven that the raw stock used is all important, not only with regard to pick, but to varnishing qualities as well. We believe all the characteristics of a good varnishing uncoated label paper should be incorporated in the raw stock.

"We mean a cleaner, stronger sheet; the present body stocks are usually too weak. We feel that this stronger sheet would eliminate a lot of shrinkage in papers. Further, this would enable us to use stiffer inks and thereby obtain much better results in our lithography. This phase, of course, should be considered in co-operation with the ink industry.

"One of our chemists expresses himself on this subject as follows . . .

"Aside from the generally accepted requirements for lithographic coated stock—that it won't pick or curl or stretch and will still print—consistency or uniformity is very important. This is true particularly in lithography because there is such a fine balance between the plate, ink, fountain acid and paper stock."

"Sometimes," he continues, "we have noticed marked sheet-to-sheet differences both in printing and in varnishing coated stock. These differences in sheets can usually be traced to roll-to-roll differences in raw stock. An inferior roll of raw stock is coated and calendered and shuffled in with the better sheets by a multiple roll cutter.

"Sheet-to-sheet uniformity is more important than skid-to-skid uniformity, because a pressman can make slight adjustments from skid-to-skid but is stuck if differences are more frequent.

"We have also noticed considerable shipment-to-shipment differences in raw stock from the same supplier and marked supplier-to-supplier differences of supposedly the same grade of raw stock This probably reflects present material shortages but may also be due to inefficient control.

"Manufacturers of offset coated stock will have to develop and use more effective control methods than they have in the past."

Here are some comments of another plant which happens to combine chemical engineering knowledge as well as a long record of practical production. Says one of the top men:

"In our plant, we do not run coated-one-side paper, which is a study in itself. Our main problems with coated stock are those of strength and dimensional change. It has been our feeling that because of so much of the sheet being taken up with coating, the length of fiber in the paper, itself, is most important. Most coated sheets we have used were short-fibered, and possibly because of the attendant lack of strength dimensional changes are accentuated. On many occasions before starting a job, we run our coated paper through the presses with the laketine size. By doing this, we give to the paper its proper stretch before the job is run. Correcting stretch and dimensional change in

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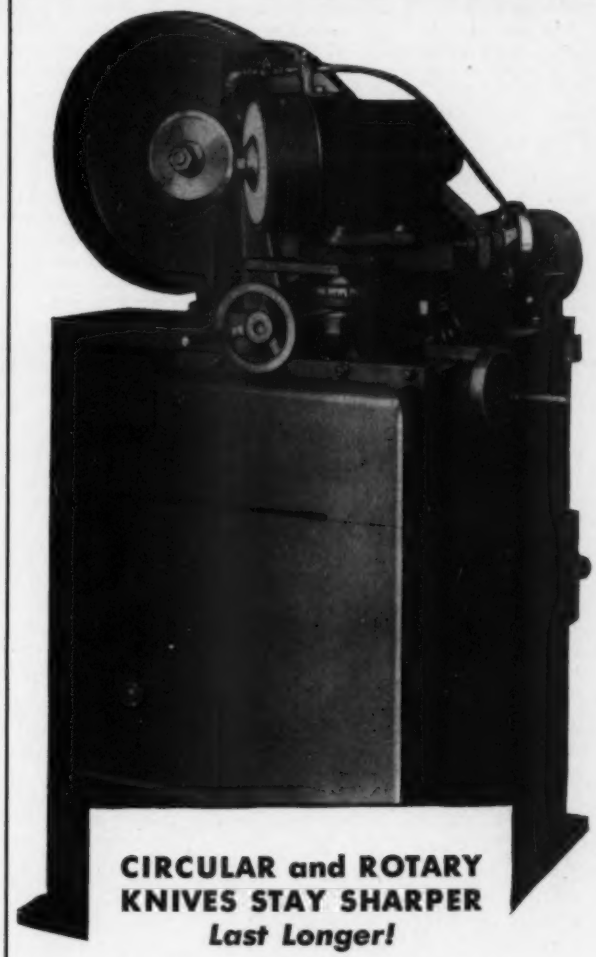

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the midst of a job, as you know, is a very ticklish operation.

"Another difficulty we have encountered is the drying of inks on coated paper surfaces. Just why this should be, we don't know, but we do find that a laketine size also helps the rapid drying of consecutive colors put on the paper in quick rotation."

Another very practical production man makes these statements:

"Over a period of years we have only used one kind of coated paper, which to some degree was developed to meet the conditions of our plant in that we operate a certain make of offset presses and have complete temperature and humidity control. We wish the mills might develop a better coating formula which would prevent the surface picking off and tearing away. This can be overcome somewhat by printing a shorter ink, but a modification of the ink formula sometimes affects the quality of the job. We have also had sheets which split under pressure. This looks like bad formation in the base stock.

"Offset Coated Two-Sides has always been somewhat of a problem, particularly where large surfaces of ink are applied. We are in hopes that the paper mills will develop a coated-two-sides sheet which will enable the lithographer to maintain standard production without the use of special quick drying apparatus."

Here's one from a man who was long a practical papermaker but who has been in an executive and production position in the lithographic industry for considerable time:

"1. The Lithographic Technical Foundation should be placed in a position so they can analyze conditions in numerous litho plants and make specific recommendations to member paper mills regarding trends in paper requirements.

Reports from the Lithographic Technical Foundation should (and I add could) be more valuable in guiding the mill than individual reports from individual lithographers picked up by paper salesmen and jobbers. (I might also add under pressure of individual job complaints).

"2. The Foundation could keep mills informed of contemplated changes and trends in equipment and techniques in litho plants and in labeling and binding equipment which might affect paper requirements. (Proposed 54" x 76" 4-color press). This type of information gotten to mills as soon as possible would keep mills ahead of changes.

"3. The Foundation could guide member mills in producing papers which will give best over-all press production.

a. Strength — requirements to permit highest press speed.

b. Curl—development of C.I.S. papers which will give minimum curl tendency under all press and labeling conditions.

c. Development of papers which will hold register and not crack on 4-color presses without conditioning (possibly coatings which are less water absorbent).

d. Incorporation of ingredients in coatings which will increase drying of inks, prevent winding and handling."

"Of all grades of paper," the writer says, "we think that coated paper has slipped the most. The coatings are too soft and, therefore, pick and peel off entirely. We also note that after printing one color, especially if it is close to a solid, the coating seems to swell and distorts the sheet. We also note that the paper is constantly changing shape. Most of it seems to stretch and fan out, but we have experienced the reverse of that, where the paper has shrunk in size. We always keep coated paper covered in our pressroom in spite of the fact that it is air-conditioned, but it has also been noted that coated paper curls and wrinkles more readily than offset paper.

"Coated-2-Sides paper we think has too much coating on it, or else hasn't got sufficiently strong body stock. After one or two colors are printed on it, it gets such a wave in it that we can't get the air in between the sheets in order to have the feeders properly operate. If you do get sufficient air, the sheet waves so much that it is moving while the suckers have hold of it, or pulls out of the suckers and goes down the tapes slightly on the bias and causes the press to trip. This, of course, causes delay and color variations through the edition."

One of the plants with a practical lithographer as the owner who also has considerable chemical and research background starts right off with this statement:

"I believe you should stress the emphasis placed by the Foundation on a scientific approach to our various problems among which paper is so prominent. This scientific approach in our industry is necessary if the technical advances in the paper industry are to be made use of to the fullest possible advantage.

"I might emphasize here the better understanding fostered by the Foundation of the relationship between moisture content of paper and performance; the advantages of humidity control in the pressroom; economy of operation when these controls are adopted, etc.

"I would also stress the interest of the Foundation in bringing within our industry properly qualified technicians of professional competence so that our industry will compliment the work done by their technicians. For as you know, it makes a big difference if paper mills have the proper co-operation from large users of paper, and no permanent improvement can surpass success in this direction by the Foundation.

"With regard to trend in our demands for paper with special reference to coated stock, I can only speak for the specialized field covered by our business, principally the canned goods label field.

"In this field the crying need is for a paper of sufficient opacity to do the job that coated-one-side paper does, leaving all other properties unchanged. In other words, the paper must take inks and varnish without undue absorption; it must not lose its squareness in large sizes; it must not wrinkle; the proper degree of whiteness must be maintained, etc., and finally the price must be right."

One lithographer comparatively new to the industry, very active and progressive and a relatively new member of the Foundation happens to have a well-qualified research man in his employ who has also worked in ink, lithographic, photochemical and supply laboratories. Instead of answering our questions direct about word to be given you on improvements you can make or directions you can take, he has submitted the following which has a great deal to do with the Lithographic Technical Foundation's position in the picture, but I think you may find it interesting.

"One of the greatest contributions of the Lithographic Technical Foundation during its first twenty years of activity was its work on paper. This work, al-

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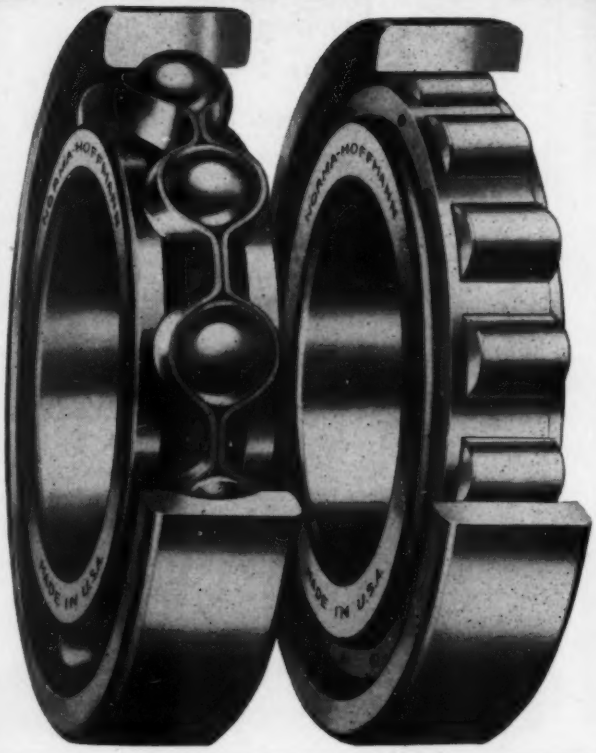

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though it did not receive the publicity it deserved, formed the basis for the specification of many of the air-conditioned plants of today. Lithographers, as had other printers, had known the effects of moisture on paper, but the degree to which these affected the printed job were not known, nor were methods of preventing much of the trouble.

"The co-operation of the paper mills in applying these results should substantiate any questions concerning the value of this work. To many lithographers the dollar and cents value of pre-conditioned paper has been enough to more than offset the cost of the research on which this method of handling paper is based.

"To be sure, a good part of the paper research program was wasted for want of technical men in the lithographic industry who were able to interpret the results of these findings, but the industry is becoming more conscious of the value of such men in plants. Where shops maintained their own laboratories, the proper use of the data made available and the instruments which the Foundation developed, greatly aided in preventing much spoilage and lost time.

"A large part of the information such as fiber length, beating time, etc., was of no value to the lithographer, and how much of these data were used in improving offset papers is not generally known among lithographers. Certainly there were many improvements in the years immediately preceding the war, but the mills never stated whether they resulted from their own private research or that of the Foundation sponsored Bureau of Standards program.

"Perhaps the greatest difficulty in any research or advancement in the graphic arts is the lack of co-ordination between the various supply trades. This applies to both letter-press and lithography but more especially to lithography since more supplies are required. Too frequently suppliers come forward with new ideas without giving any consideration to what changes in materials, technique or equipment are necessary to make the use of this idea practicable. Many useful improvements have gone by the board and much money wasted because suppliers attempted to work independently of the rest of the industry.

"One of the last prewar projects undertaken at the L.T.F. laboratories under the sponsorship of an ink company showed that there was a definite relationship between the chemical composition of the coating on paper and the speed with which ink dries. Ordinarily a paper company would not undertake a project involving a study of both ink and paper such as this, and it would require a very complete knowledge of the lithographic process to determine if the best ink-paper relationship could be run in routine shop production. It is in projects like this where the interests of several different groups of suppliers are involved that the co-ordinated research of the Lithographic Technical Foundation is most valuable. There are many such problems to be solved, and many cannot be solved at all until there is a more complete understanding of the process itself.

"General problems relating to the manufacture of paper with certain properties should not be undertaken with Foundation manpower or equipment, but research and investigation to determine what properties are necessary for best results in the lithographic process should only be undertaken through an organization such as the Foundation."

Now here is the last excerpt from letters selected:

"I have talked with various men around the plant relative to paper research, having in mind particularly, coated paper, as you suggest. Their suggestions fall into two groups: research to cure recurrent faults; research directed toward an improved paper for lithographing purposes.

"In the first category fall such difficulties as are listed below.

"Curling of coated paper toward the coated side with its axis the long way of the paper, parallel to the gripper, is one such difficulty. This is not always helped by conditioning and the tendency to curl sometimes increases with each passage of the paper through the press. Thin stocks show a greater tendency to curl than heavier stocks. On the other hand, many coated stocks, both thin and thick, give no trouble from curling, showing that it can be done.

"Drying of inks on a coated stock is more of a problem than on uncoated

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stocks. That this is due to ink vehicle going into the coating is indicated by the fact that a second color printed on top of a previously printed color, dries better than the same color printed on coated stock alone.

"Lifting of ink on coated stocks is much more of a problem than the lifting of ink on uncoated stocks.

"Wavy edges, even after conditioning, cause trouble with misregister and creases.

"Expansion of the stock, particularly along the back edge, is a common source of trouble, but a worse source of trouble is where this factor varies in a pile or from pile to pile because press adjustments made to meet this condition at the start, cannot be changed without increasing the trouble.

"Picking of surface is a source of trouble but this is more of a problem on uncoated stocks than on coated stock.

"In the second category, research should be directed toward the making of a paper especially adapted to lithography without necessarily increasing the price range. Factors to be considered in this category should include the following:

"The clean and sharp lifting of ink from the blanket—tied up, of course, with co-operative blanket research.

"The paper should allow the ink to dry without offset on the next sheet and to dry with the minimum change in color from the shade as first printed, involving co-operative research with ink manufacturers.

"The paper should work well on automatic feeders.

"It should lie flat in the delivery pile.

"It should show minimum expansion to press moisture.

"It should show uniform response, one sheet after another, to press conditions and adjustments.

"Research with the object of overcoming some of these factors or at least minimizing and standardizing them, will be a big help to the Lithographer."

The selected excerpts inserted in this paper are taken from a 100 per cent response to my inquiry.

They make up a reasonable sample cross section of opinion of something like 1/3 of the dollar volume of the industry.

Such a section obviously does not reflect conditions a year ago or a year from now. It may give you an idea of what can be done statistically or otherwise at any time.

If you accept the information on that basis and for what it is worth, here is how all the replies summarize as to complaints and constructive suggestions, not necessarily in the order of their importance:

1. Complaints

Insufficient resistance to picking and peeling
Tendency to curling
Tendency to tearing out
Irregular effect on drying of inks causes lifting of ink
Too great dimensional changes
Tendency to wavy edges
Lack of sheet-to-sheet uniformity
Wide variations in moisture content
Minimum weight limit too high for mailing requirements
Wire variation in ink receptivity
Interference with pH control
Weak body stocks
Insufficient opacity in lightweights
Insufficient whiteness
Splitting and cracking
Some coatings too water absorbent
Generally slow down press production

2. Suggestions

(a) Research should be directed toward the making of a coated paper especially adapted to lithography—one and two side coated.

(b) Such a sheet or sheets should have these standard characteristics:

Adherence of the coating to the base stock at all press speeds
Sufficient strength in base stock to feed and handle at all press speeds
Dimensional stability
Minimum effect from press moisture
Uniform response one sheet after another to press conditions and adjustments
Clean and sharp lifting of ink from the blanket, (achieved by co-operative blanket research with Lithographic Technical Foundation)
Allow ink to dry without offset on the next sheet and to dry with minimum change in color from the shade as first printed, (achieved by co-operative research with ink institute and manufacturers and Lithographic Technical Foundation)

Have minimum effect on *p*H of fountain solution and images, (achieved by co-operation with Lithographic Technical Foundation and Ink Institute research on pH control.)

Uniform ink receptivity — achieved by co-operative research with Ink people

A through and through sheet with all the above characteristics.

We on the staff of the Lithographic Technical Foundation and the officers and directors don't care who does the research as long as it is done.

The Lithographic Technical Foundation carries on co-operative and combined research and stimulates private and related industry research to improve the process and remove human variables, reduce waste, and increase press production, etc.

Education on the use and handling of paper is a top subject in our educational program and has much to do with better use of paper and reduction of complaints. The information dominates more than 10 per cent of our publications—more than any other single subject. Perhaps that is part of the reason why paper jobbers are currently supporting Lithographic Technical Foundation programs to a greater extent than paper mills—or perhaps why ink makers who get only 10 to 15 per cent of lithographic dollars are supporting the programs 2 to 1 over paper mills.

So you men of faith in research, technical and production knowledge must make it plain to your principals and we to ours that the co-operative research and services of this institution on the lithographic process and related materials has for twenty years benefited lithographers and suppliers and the whole ink-on-paper business.

The paper industry should fully support its own industry research first, of course, and its private research and actual research be done under its supervision. But it will get nowhere fast trying to do lithographic process research itself as basis of paper research. It's no different in principle than our doing manufacturers paper research.

If you believe in research and particularly in informational and educational services to effectuate the results, then you must realize paper mills are denying themselves real opportunity to maximum benefit from the modern facilities and manpower available through the re-organized and revitalized L.T.F.

Here are two specific things you can do about it. Make known the reasons for support of you believe in them. And if you technical and production men wish, we'll make available the time of Professor Reed and such other members of the staff, including my son, as is necessary to work out these two steps.

(a) Prompt and practical surveys leading to the development of up-to-date-and-demand standard specifications, characteristics and requirements for coated and other papers for offset lithography.

(b) For actual full time work in establishing effective co-operation and working co-ordination of such lithographic research as should be co-ordinated with ink and paper research.

Responsibilities of Supervisors In Labor Relations

G. R. SCHENCK, Riegel Paper Corporation

I do not intend to discuss the legal, technical, or political phases of labor relations which are currently being debated with so much vigor over the radio and in the newspapers, magazines, and journals. When all of these passionate and learned dissertations are boiled out, the one fact that remains crystal clear is that the basic problem in industrial relations in any company, in any industry, in any part of the globe, is how best to get the co-operation of employees in attaining the collective purpose of the organization.

If we agree that the primary problem is how to obtain understanding teamwork among all members of the working force, then one of the most important corollary problems is how to develop and maintain an unobstructed channel of communication within the organization from the top to the bottom. It is a truism that in human relations we enjoy the confidence of others to about the same degree that we confide in them. Can we be reasonably sure of enthusiastic co-operation and teamwork with either supervisors or rank and file employees through any channel other than consultation and the solicitation of opinions and suggestions. The answers to these questions should be obvious. This to me is the one major human

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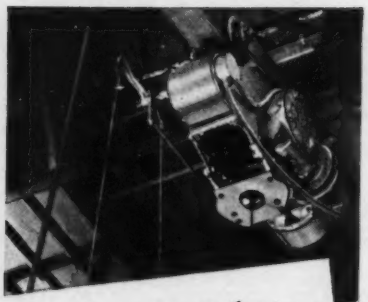

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problem in industry because there exists considerable and unavoidable separation between the top and the bottom. It is here that the superintendents and their supervisors at each successive level in the organization must play a vital part in relaying information accurately up and down the line if teamwork is to be achieved.

Acceptance of this concept of the responsibility for the sound administration of a company's industrial relations program leads directly and logically to the next point; that is, how can our supervisors be expected to administer labor relations in the plant unless they know what the policies are and unless they are kept informed currently on how these policies are to be interpreted. Unless there is a regular, rather than a spasmodic channel of communication, our supervisors and consequently our executives, will fail in the proper discharge of their labor relations duties. To be effective such a channel of communications must rest upon a framework of clearly stated and written labor policies that lend themselves to uniform and equitable interpretation. Unless such a framework has been provided, the problem of assuring uniform interpretation and administration of labor policies becomes hopeless and the supervisory forces become impotent. Is it fair to ask our supervisors to administer management's policies blindly, or to expect them to function smoothly or intelligently unless they take part in our policy discussions and so believe sincerely that they are part of the management? Can we not utilize this store of knowledge among our supervisors and at the same time give them added confidence in their status? Should we expect other than passive resistance or perhaps resentment when we fail to demonstrate our confidence in them?

How then should we approach this problem? The desired results cannot be had merely by reducing policies to writing. Policies, if they are to be effective, must be accepted wholeheartedly by supervisors as practical and realistic guides to action. This means that they must be clear in meaning and shaped to fit the particular requirements of the individual organization. Too often policy statements are regarded, and perhaps properly so, as idealistic, academic and unworkable. Too often they bear the earmarks of having come from the "ivory tower." Such policies are properly resented by those who must try to administer them.

We believe that if these criteria of good policies are to be met, supervisors at all levels in the organization should actively participate in the formulation of the policy statements. The foreman, for example, because of his responsibility for operations, is in a peculiarly advantageous position to reflect the attitudes of his employees toward management's proposed plans and practices and we should utilize his knowledge. The superintendent can and should contribute to the process of policy formulation because of his broad knowledge of both departmental and inter-departmental operations and problems. The collaboration of top executives becomes necessary because it is at this level that final decision must rest when proposed policies involve sizeable financial commitments or long-range personnel adjustments and planning. Successful experience with this form of consultative management indicates clearly that each level of supervisors can and should make its own contribution to the process of formulating policy statements and their attendant administrative procedures. The personnel or industrial relations department should function throughout this entire process in an advisory capacity and should provide the necessary research so that the policies developed by line management will be in keeping with accepted and current good practices and trends in the industry and in the geographical area.

This principle and practice of collaboration in policy formulation is equally applicable and perhaps even more important in situations where there are union agreements. As many of us know, the well schooled union steward—and union stewards will become better schooled as time marches on—is likely to do a thorough job of policing and the contract provisions will in all probability become as sacred to him as the Koran is to the Mohammedan; but the foreman and his superiors must also be thoroughly acquainted with existing contract provisions and when the contract is up for renegotiation their opinions and suggestions should have been solicited and summarized. Who, other than these line supervisors, know better how the contract has worked and what the rank and file employees really want?

In another direction also, the responsibility for harmonious relations lies almost completely with line supervision. I refer to the individual problems of employees. The supervisor who knows his men will be aware of their personal difficulties and can assist them to become better oriented to their situations. An employee who is well oriented is a satisfied employee and as such he is willing and anxious to co-operate. Such problems and personal contacts touch almost every phase of labor relations. I can do little more than list some of them in the time allotted to me, but you will recognize that in each case the attitude and the activities of the supervisor can be most important to their proper solution.

1—There are problems of employment and placement—the ever present question of who fits best in a given job. Poor selection and placement are always reflected in labor turnover and will be found lurking in the background of many complaints and grievances. Supervisors should be responsible for the final selection of employees from among the applicants referred to them. In this they should have the guidance and counsel of the personnel staff.

2—There are problems of training—how to instruct workers in the methods of doing their jobs. This is almost wholly a responsibility of line supervision but again the experience in other companies and in other departments in the mill should be available to you through the personnel department.

3—There are problems relating to working conditions, safety and health—how to maintain reasonable hours and to distribute overtime fairly. The question of how best to maintain congenial and healthful

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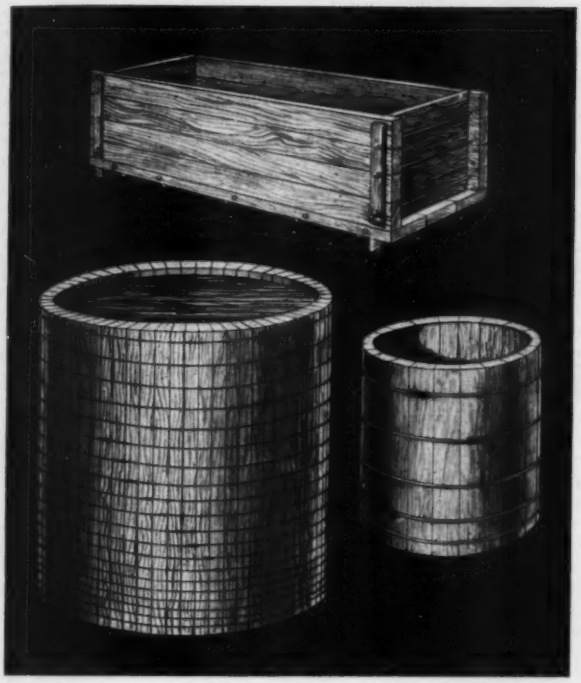

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working conditions, and how to eliminate unsafe conditions and practices, fall into this category. Again the supervisor is in a position to recommend action but he would do well to consult the personnel department freely and get all of the facts and experience that is available there to guide him.

4—There are problems of wage payments—how to pay employees adequately for the work they do. The supervisors intimate knowledge of the job is an important factor in setting job rates, whether these be established through job evaluation, wage surveys, or any other system that may be used.

5—There are problems relating to promotion—how to advance people in accordance with their demonstrated abilities. Who knows the individual better than the one who supervises his work and management would do well to lean heavily on his judgment.

6—There are problems relating to the so-called welfare of employees—how to help them in time of need and retirement, as well as how to provide social and recreational activities for them during their periods of employment. The counsel of the supervisory staff should be of great value in the formulation of all such programs.

7—There are problems relating to collective bargaining in organized plants, or of dealing with individuals or groups of employees in unorganized mills—how can we give the employees the opportunity of saying and doing something with regard to the conditions of their employment, and how can we be sure that our decisions meet with their general approval?

In the final analysis, the successful handling of grievances and indeed of successful labor relations in all of its aspects must depend upon the attitude of the management personnel concerned. Assuming that policies have been defined and clearly established and that supervisors know the areas of their responsibility and authority, most labor relations problems enumerated so far, and specifically the handling of grievances, can be met squarely by the supervisors if they recognize and understand the accepted techniques for adjusting personal differences. Although it may be argued that the gift of handling people is intuitive to some degree, I should like to stress also that in its initial stages it is essentially a form of interview. The supervisor should know how to get people to talk clearly and freely about the matters which are troubling them and how to interpret what they say.

Because of the importance of the interviewing technique, I should like to speak about it, not in full detail, but sufficiently to indicate a few basic principles.

First, the supervisor should learn to listen. People cannot communicate to him unless he does. He should not interrupt because he wants full expression.

Second, he should give full attention to the aggrieved employee and be sincerely interested because this attitude alone will encourage confidence and expression.

Third, he should not argue or give advice until it is asked for.

Fourth, he should be listening not only to what the employee says, but he should listen also for what he does not say or cannot make clear without help. The supervisor should consider and weigh what the speaker says in relation to the total situation and the employee may have to be drawn out so that he is clearly conscious of all relevant facts and situations.

Fifth, the supervisor should have the employee repeat all or parts of his story until the facts are clearly established.

Sixth, the supervisor should, at the close of the discussion, summarize the interview so that the employee is confident that his position is understood. Having obtained the facts, the supervisor should consider the employee's problem on its merits. He should avoid log rolling or horse trading which tend to make personal problems grow into group issues. He should not pass the buck but should make or get a decision and support that decision with the reasons "why." As he gives the decision, he should do so with the full knowledge and recognition of the employee's right to appeal it and he should be willing to help the employee carry his case further. If facts warrant such action, he should be willing to modify his decision, or accept gracefully a reversal. In any event, the foreman should follow through with corrective action promptly and then at some later time assure himself that the decision was sound.

Above all, a good supervisor will keep his eyes and ears open for situations that need attention and will correct them before they become magnified and perhaps reach an explosive stage. Preventive supervision is in any case superior to the most effective technique of handling problems in the field of labor relations. Furthermore, a supervisor should not be criticized because grievances have originated in his department. Such criticism as may be warranted should be reserved for those cases in which the foreman has failed to handle a grievance properly.

Vortrap Systems and Improvements

H. E. INGALLS
Nichols Eng. & Research Corp.

There are three sizes of the Nichols Freeman Vortrap in general use in paper mills: 1½-, 3- and 4-inch. (These figures indicate the diameter of the cylinder.) Two other sizes: namely, 8- and 10-inch, are gaining favor in handling rough stock and in pulp mills for removal of heavy dirt and metallic particles.

There are two principal systems in general usage in the industry: the so-called standard system and the primary-secondary system. There are modifications for different applications, but for this discussion, the two systems based on the standard layout are considered.

The standard system consists of one or more standard traps mounted in the most convenient manner. A single pump, used for supplying these traps, takes its suction from the white water box or the wire pit, depending on the machine system. This pump mixes the stock and white water and delivers it to the inlet. The outlet system is piped so that the accepted stock may be delivered through two control valves either to the machine or recirculated through the pump suction system, thus giving control on the machine and loading the system as required for efficient dirt removal. A water washline is piped to a fitting above the waste receiver and is used only for backwashing and filling the waste receiver.

The rejected dirt filters down into and is collected in the waste receiver at the base of the Vortrap. Periodically, this dirt must be washed out manually by closing the valve at the base of the cone and opening the valve below the waste receiver. After flushing the receptable, this valve is then closed, the receiver filled with water, and the valve at the base of the cone is opened.

In the primary-secondary system, the primary section is practically the same as the standard system, with the following additions. A master valve is recommended at the discharge point of the outlet header. Control of stock beyond this valve is the same as with the standard system. It is necessary to pipe a ¼-inch washline to the base of each waste receiver for dilution purposes and a ¼-inch valve is provided for control. At the top of this waste receiver, a special union tee fitted with an orifice is provided which controls the rate of outward flow of liquid rejects from the receiver. This tee, in turn, is piped to the rejects header which receives rejects from all primary Vortraps and connects with the suction of the secondary Vortrap pump.

The secondary system consists of one or more secondary traps supplied by a pump which takes its suction from a supply of lean white water. The rejects from the primary system join with the white water close to the pump suction. The size and number of secondary traps is based on the number of primary units, but in the larger systems one secondary unit will handle up to nine or ten primary units of the same size. The accepted stock from the secondary system is delivered to the suction of the primary pump for recirculation through primary traps before being delivered to the paper machine.

Many mills are successfully taking a continuous flow of rejects from their rotary screens at the head of the machine and introducing them laterally into the suction pipe to the secondary pump, and thereby eliminating the need of auxiliary screens. This practice is steadily increasing in popularity.

Briefly, the primary-secondary system functions as follows. A master valve which is provided at the discharge of the outlet header acts as an orifice, and once set for the proper difference in pressures, needs not be changed unless the system, in general, is changed as regards total stock gallonage. This master valve maintains a constant pressure in the outlet header, which in turn provides constant pressures at all other relative points in the traps. The ¼-inch dilution line at the base of the receiver, when provided with a constant pressure and volume of water, can be adjusted for a constant and uniform dilution in the waste receiver. This means that a constant volume of diluted fiber and rejects is discharged through the controlled orifice in the outlet of the receiver and rejects are continuoutly carried through to the secondary system.

It is important that the consistency in the secondary system be kept as low as possible, preferably to ¼ of 1 per cent. It is recommended that the dilution white water be very low in fiber content, and with this dilution, dirt removal is increased and the rejects from the secondary trap are relatively low in fiber content. Fresh water is also introduced at the base of the secondary receiver. The same principle of a continuous discharge through a control orifice is again applied. This results in the final rejects of this system being discharged in a stream of almost clear water, with resultant minimum fiber losses.

In systems on machines making grades of paper containing 10 per cent ash or less, the total solids rejects loss usually runs between 3- and 5-pounds per ton of paper. This loss includes dirt, organic matter, and fiber. Sheets having an ash content of higher than 10 per cent, show an increase in solids rejects, but tests have shown that often this increase usually includes rejected filler which is not to be desired in the finished sheet.

Pressures are important to efficient operation of the systems. Under practically all conditions, the pressure on the inlet header of the primary system should be 30-pounds where there is no static lift of the stock at the discharge of the system. Pressures on the outlet header should be from 5- to 8-pounds, giving a 22- to 25-pound differential. For a single unit, the inlet pressure should be approximately 25-pounds and the outlet pressure from 4- to 7-pounds. This gives an 18- to 21-pound differential in the single unit installation. The system should be designed and pumps selected carefully to obtain these recommended pressures and avoid a needless waste of power.

In general, the standard system may be considered for the removal of heavy dirt on machines and systems where the ma-

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chine tender or some other person has time to take care of the system and dump the waste receivers.

The primary-secondary system will remove the heavy and the fine dirt, as well as a considerable quantity of undesirable organic material The primary-secondary system operates automatically and rejects foreign matter continuously, requiring only occasional observation and checking.

The units can be furnished in special materials, such as all stainless steel construction, rubber-lined units, lithcoting, or other enameled construction.

A survey of the installations in the United States was made recently and it was found that Vortraps are being used on practically all grades of pulp and paper stock including tissue, glassine, rag, book, and bond, groundwood, sulphite, and soda pulp specialties, news, unbleached and bleached kraft, rope, straw, hemp, rough stock, deinked stock, and many other special uses including water purification, oils, slurries of clays, graphite, pigments, etc.

Abridgments in this section are from papers presented at the annual meeting of the Technical Association of the Pulp and Paper Industry held in New York City, February 24-27, 1947.

Experiments on the Grinding Of Quaking Aspen and Use of Pulp in Printing Paper

AXEL HYTTINEN, Chemical Engineer
G. E. MACKIN, Technologist
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Forest Products Laboratory*

Although small quantities of aspen have been used for groundwood pulping for a good many years, published technical information on such use is fairly limited. Thickens and McNaughton (1916 Groundwood Pulp. U. S. Dept. Agriculture Bulletin 343) found that aspen required a duller stone surface and a higher energy consumption than spruce. Munro (1923 Poplar Wood as a Substitute in the Manufacture of Groundwood. *Paper Trade Journal* 77, 20:60) noted that under the same conditions of grinding, the freeness of aspen pulp was much higher than that of spruce. The strength of aspen pulp, according to Munro, was about half that of spruce. The experiments of Wynn-Roberts (1937 Grinding Characteristics of Various Woods. *Paper Trade Journal* 104, 6:46-48) showed that an aspen consumes much more energy than does spruce for the same strength of pulp. Running (1941 Hardwood Utilization by the Paper Industry. *Pulp Paper Magazine, Canada* 42, 2:104-106, convention issue) reports the strength of aspen to be about one-half to two-thirds that of spruce ground under the same conditions.

A study of the grinding of aspen and the use of its groundwood pulp in printing and specialty papers is being conducted at the Forest Products Laboratory. This report, covering part of the study (Acknowledgment is made of the co-operation in this work by the Consolidated Water Power and Paper Company, Wisconsin Rapids, Wis., the Kimberly-Clark Corporation, Neenah, Wis., and others), includes experiments showing the effect of grinding pressure, grinder pit temperatures, and pulp consistency, at various stone-surface conditions, on production rate, energy consumption, and properties of the pulp. Representative pulps were used in experiments on making paper of book grade.

The wood used for these experiments consisted of one shipment of seasoned white spruce pulpwood and three shipments of green quaking aspen (*Populus tremuloides*) pulpwood.

The Forest Products Laboratory experimental grinder has three pockets 16 inches wide that take bolts of wood 6 inches long, and it is equipped with a pulpstone 54 inches in diameter by 8 inches wide. A 3760/5N7 Norton carborundum stone, dressed with a 10-cut, 1½ inch-lead, spiral burr and a 14-point diamond burr was used for this work. The installation has automatic devices to maintain shower-water and grinder-pit temperatures at the desired constant values. Control of the shower-water temperature permits controlled variation of pulp consistency at constant grinder-pit temperatures. Before making a grinding experiment, the grinder

(*) Forest Service, U. S. Department of Agriculture, maintained at Madison, Wisconsin, in co-operation with the University of Wisconsin.

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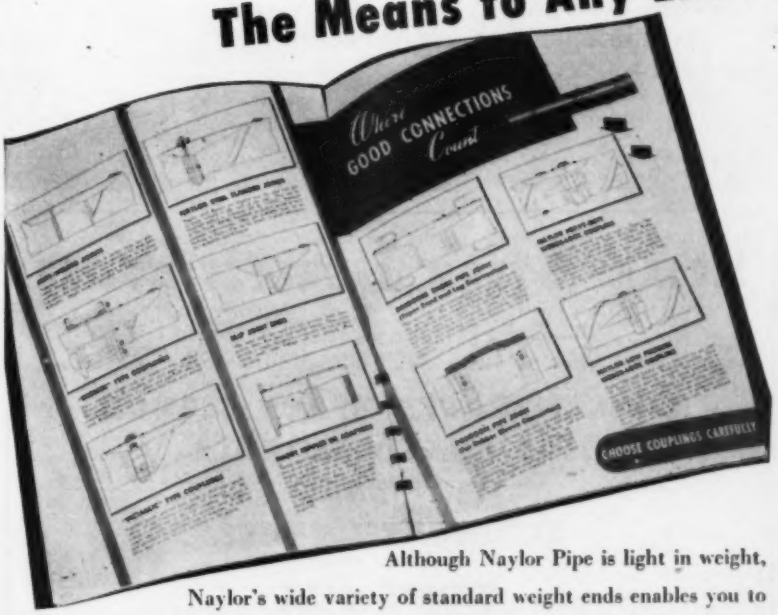

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and stone were gradually brought to the desired pit temperature with heated water. Immediately before starting the run, the temperature of the water in the pit was quickly lowered about 20 degrees by running colder water into it. At this point the grinding was started. Because the pit temperature was below that set for the pit-temperature regulator, the shower-water valves were automatically closed during the first few minutes of the run. This control permitted the consistency of the pulp accumulating in the pit to rise quickly to a value approximately equal to that desired for the test. When the heat produced by the friction of the stone on the wood had caused the pit temperature to rise to that set by the controller, shower water was automatically admitted to maintain the pit temperature. Slight adjustment of the shower-water temperature was then made, if necessary, to obtain the desired consistency.

The groundwood pulp was run through a sliver screen and a flat-plate screen fitted with 8-cut plates, then dewatered on a wet machine. Pulp test sheets were made of about 115-pound-basis weight (25x40—500), and were tested by TAPPI standard methods. The screen analysis of the pulps was made with the Appleton selective screen.

Most of the grinding experiments discussed in this report were carried out in two parts. In Part 1, aspen was ground at a peripheral speed of 3,468 fpm. For each of the three stone-surface conditions used, nine experiments were made, consisting of three grinding pressures at each of the three pit temperatures. Grinder-pit pulp consistencies were kept between 3 and 4 per cent, except in a few instances in which 4 per cent was inadvertently exceeded. Stone-surface condition was gauged by the freeness of pulp produced in trial runs at 15 pounds pressure and 155 Fahr. Freeness values of approximately 200, 80, and 50 cc., Canadian Standard, were selected to represent the sharp, medium, and dull surfaces, respectively.

In Part 2 a speed of 4,185 feet per minute was used to grind aspen and spruce. Experiments, identified as Series A, B, C, D, and E, were made at each of five different stone-surface conditions, which represented progressively duller surfaces. Series A, C, and E were made to study the effect of varying the pressure, and series B and D were made to study the effect of varying the temperature and pulp consistency. Series A and B were made at stone-surface conditions intermediate to series 1 (sharp) and 2 (medium) or Part 1. Series C and E were made at about the same stone-surface conditions used for the medium and dull surfaces, respectively, in Part 1. One experiment with spruce was made with each of the five stone-surface conditions.

In Part 2, an extra run duplicating one of the series was made at each surface condition. The duplicate runs were mixed to provide the pulp necessary for paper-machine experiments. Each of the five pulp mixtures were used in three different furnishes for book-grade printing paper.

At the lower speed (Part 1), on the sharp stone surface, an increase in temperature, with the pressure constant at either 10, 15, or 20 pounds psi of wood against the stone, resulted in a marked increase in freeness and a decrease in density of the test sheets but produced no significant effect on energy consumption, grinding rate, strength, or fiber length. With the medium stone-surface condition, an increase in temperature, with the pressure constant at either 15, 25, or 35 pounds psi, produced a less marked increase in freeness and decrease in density of the test sheet. With the dull stone surface, the effect of increasing the temperature, with pressure constant at either 15, 25, or 35 pounds, was almost negligible on the freeness but density of test sheets was decreased. Thus, at a given pressure, the effect of increasing grinding temperature from 125 to 155 to 185 Fahr. was principally a tendency to increase freeness, except on the dull surface, and to decrease the density (namely, to increase the bulk) of the test sheet. The strength was not, in general, affected by increase in temperature, although there appears to be a slight increase in tear and a slight decrease in tensile strength with practically no change in bursting strength.

In the experiments made at the higher speed (Part 2), the temperatures studied did not cover so wide a range as those at the lower speed. In series B, on a moderately sharp stone, increasing the temperature from 130 to 165 to 185 Fahr., with pressure constant at 15 pounds and consistency at 3.5 per cent, resulted in a slight trend toward greater energy consumption, lower strength, and lower density of test sheets. In series D, on a medium-dull surface, increasing the temperature from 130 to 165 to 185 Fahr., with consistency constant at either about 2.0, about 3.5, or about 5.0 per cent and the pressure constant at 20 pounds produced no consistent trends due to increase in temperature. In comparison, as already noted above, in experiments at the lower speed at medium stone-surface condition, the effect of increasing the temperature from 125 to 185 Fahr. at 15 and 25 pounds pressure was principally that of increasing the freeness.

A study of the effect of pit consistency was made at the higher speed on the moderately sharp and medium-dull stone surfaces. In series B, increasing the consistency from 1.6 to 3.5 to 4.2 per cent, with the temperature constant at 165 Fahr., produced no significant effects on grinding characteristics nor on pulp properties. Likewise, in series D, increasing the consistency from about 2.0 to about 3.5 to about 5.0 per cent, with the temperature constant at either 130, 165 or 185 Fahr., produced no important effects, although there was a slight trend toward lower freeness and higher energy consumption with increasing consistency.

The effects of increasing grinding pressure, with other conditions constant, were to increase the grinding rate, freeness, and fiber length, and to reduce energy consumption, and the strength and density of the pulp test sheet, which, for the most part, was to be expected. In general, greater change, proportionately, occurred

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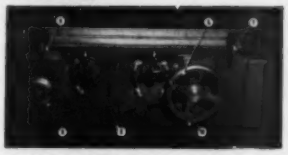

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in grinding rate and pulp freeness than in other effects and properties as the result of changes in pressure. Changes caused by pressure were generally less pronounced between 25 and 35 pounds psi than between 15 and 25 pounds psi. For example, for the medium-sharp stone surface and lower speed, changing the pressure from 15 to 25 pounds psi caused an increase of 202 per cent in grinding rate and 78 per cent in freeness, whereas the reduction in energy consumption was 37 per cent, and in other pulp properties, 18 per cent or less. The corresponding changes caused by raising the pressure from 25 to 35 pounds psi were an increase in grinding rate of 74 per cent, and in freeness of 28 per cent, with a decrease in energy consumption of 17 per cent and of 24 per cent or less in other pulp properties.

Certain results caused by changing the surface speed of the stone from 3,468 to 4,185 fpm have been previously mentioned. For instance, at the lower speed, the principal effect of raising the temperature was to increase the freeness of the pulp, whereas, at the higher speed there appeared to be no important effects on grinding characteristics of the wood nor on the pulp properties that could be attributed to changes in temperature.

A comparison of the effects of the two speeds at nearly equal conditions of stone surface, pressures, and temperatures shows no consistent trends in pulp properties, energy consumption, and production rate, although higher speed favored higher freeness in the majority of cases. On the other hand, if a comparison of the effect of speed is made without regard to the pressure and temperature but on the basis of equal energy consumption for given stone-surface conditions, the grinding rate and freeness are found to be generally higher and the strengths generally lower at the higher stone speed.

For a given stone-surface condition, the strength of the pulp increased, in general, with increase in energy consumption. For a given energy consumption, the stronger pulps were produced by the duller surfaces.

Generally, for a given strength, the grinding rates are higher and the energy consumptions lower with duller surfaces than with sharper surfaces. A pulp with a bursting strength of 0.22 point per pound per ream, if produced on the dull surface at the lower speed, would be produced at rates of about 1-ton per square foot per day and about 66 horsepower-days per ton; on the medium surface, the rates would be about 0.95 ton per square foot per day and 73 horsepower-days per ton; and on the sharp surface, the rates would be about 0.18 ton per square foot per day and 120 horsepower-days per ton.

Comparison of spruce and aspen ground under the same conditions showed a higher energy consumption, a lower grinding rate, higher strength, lower freeness, and lower average fiber length for the spruce than for the aspen. It was indicated that to produce pulps of equal strengths, aspen would require much higher energy consumption than spruce.

Papermaking Equipment and Operation

The paper machine runs were made on the Laboratory's 12-inch experimental fourdrinier machine under conditions approximating those found suitable for making satisfactory paper from standard commercial pulps.

All runs were made at wire speed of about 80 fpm, and a nominal weight of 40 pounds (25x40—500) was chosen as the basis weight.

Samples of each paper were obtained for physical tests, and headbox samples were taken at the end of each run for stock-freeness and consistency determinations.

Each of the five aspen groundwood pulps used was a mixture of two pulps produced under comparable grinding conditions. Each mixture represented one of the five stone conditions used in Part 2 of the pulping experiments. The experimental spruce groundwood pulp used was a mixture of three pulps produced at stone conditions A and B.

The chemical-pulp component for all runs was bleached sulphite (mainly spruce) obtained from a manufacturer of book-grade pulp. Book-grade groundwood composed of a mixture of spruce and aspen was also obtained from the same source for use in some of the furnishes.

All furnishes were prepared in the Laboratory's 50-pound capacity beater, and although no beating was given the pulps,

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sufficient circulating time was allowed to obtain a uniformly dispersed stock. Twelve per cent clay, 1 per cent rosin size, and 2 per cent alum were added to the furnish. Sufficient sulphuric acid was added to obtain a *p*H of 5 in the beater, and this *p*H was also maintained on the paper machine during the runs by adding sulphuric acid continuously at the head box.

Since but one run was made on each of the furnishes just described, it was possible to obtain indicative information only, and the observations made during the runs and the conclusions drawn from analysis of the test data can only represent general trends that may be expected. It was observed that the use of aspen groundwood in these furnishes tended to produce a relatively low wet-web strength that required greater care in the adjustment of the draws between sections of the paper machine. It was also observed that although excellent formation was relatively easy to obtain, the drainage of water on the wire was slow and the wet-web was easily marked by the felts. More picking at the presses and on the dryers was noticed when the higher percentages of aspen groundwood were used, and this tendency was increased with the use of the higher freeness groundwood pulps. However, no appreciable changes in operating conditions were required throughout the series of runs, and except for more precise control requirements, it was concluded that no great difficulty would be encountered in running any of these furnishes on commercial-type equipment.

The density of the papers made with the aspen groundwood pulps was higher than that of the reference-standard run and of the all-spruce sheet.

The relatively high-freeness and low-strength aspen groundwood made on a sharp stone surface produced the lowest-strength paper.

Aspen groundwoods produced on medium-sharp and medium-dull stone surfaces and having moderately high strengths produced papers having the highest tensile and bursting strengths regardless of the furnish used.

In most instances, the opacity of the papers made with aspen groundwood was less than that of the reference-standard and of the all-spruce sheets.

Some of the papers made in the experiments described above were tested for coating, supercalendering, and printing characteristics in the laboratory of a commercial book-paper manufacturer. The results of these tests indicated that the aspen groundwood did not impair the printability of the paper. However, the relatively low strength and high density of the papers were somewhat objectionable characteristics, since the low strength would tend to cause breaks during printing and the high density would reduce the amount of coating that could be applied to the sheet. It was concluded that these objectionable characteristics could be overcome to a satisfactory degree by adjusting the proportional amounts and the types of pulps in the furnish.

Open Top Diffusers

PHILIP J. HANNAN, Pulp Mill Supt.
Southern Advance Bag & Paper Co., Inc., (Hodge, La.)

The decision to build open washers early in the history of the Hodge mill was motivated not especially to have this type of diffuser, but merely to have a separate washing system for a special purpose; namely, to wash hardwood. This short-fibered stock had a tendency to pack quite hard against the bottom plates in the tall pressure diffusers with a resulting very slow rate of washing, and the wide, shallow wash pans were a happy solution. After separate hardwood cooking was discontinued, the open top diffusers were kept in use with the regular diffusers, to increase the total washing capacity. In their present cycle of operations they receive exactly the same kind of pulp and size of charge as do all the other diffusers. The closed units have a diameter of 10 feet and are 20 feet high, while the open tanks are 19 feet in diameter by 14 feet high. It can readily be seen that a volume of pulp sufficient to fill the closed diffuser will in the open tank reach a height of only about 5½ feet.

It does not appear possible to get a charge of stock packed into a wash pan with sufficiently equal resistance throughout to prevent the appearance of clear effluent through the bottom at one spot while another still shows black. It is undoubtedly because of this defect that,

in spite of the more rapid washing rate, the average liquor to the evaporators is slightly weaker from the open top than from the closed diffusers.

A second disadvantage in the wash pans is the heavier stock loss into the effluent liquor. This is readily explainable from the large area of the perforated bottom. It is not entirely a loss, since the black liquor filter stock is sent back into the system, but is an added nuisance—and in the final clearing up period runs into an actual loss to the sewer. It might be mentioned here also that the larger diameter of the open pans adds about 15 minutes to the dumping time.

The higher maintenance on bottoms in the open top diffusers is compensated for by the higher daily turnover possible with these washers.

Pulp washing is, at best, a very inefficient process. If it were necessary only to rinse the liquor off the surface of the fibers, like rinsing off steel wool, the problem would be simple. What actually must take place is slow diffusion and mixing of the water adjacent to the fiber with the liquor held within it, while the concentration of the external solution approaches but never reaches that within the fiber. When this diffusion has proceeded far enough, the pulp fiber can be declared clean. It requires a definite time element, a soaking out period, which is more probably present in the slowly travelling phases of the shallow wash pans. This slow rate of travel is readily provable, even in the face of the shorter washing time, by basing calculations on the short distance from the top of the pulp charge to the bottom.

To sum up, in the open top diffusers the only apparent advantage is a shorter washing cycle. The chief disadvantage lies in channeling, with resulting "slick spots" in the pulp, and slightly weaker effluent. Until this trouble is successfully overcome the concensus of opinion among the plant operators is that the closed diffusers are to be preferred.

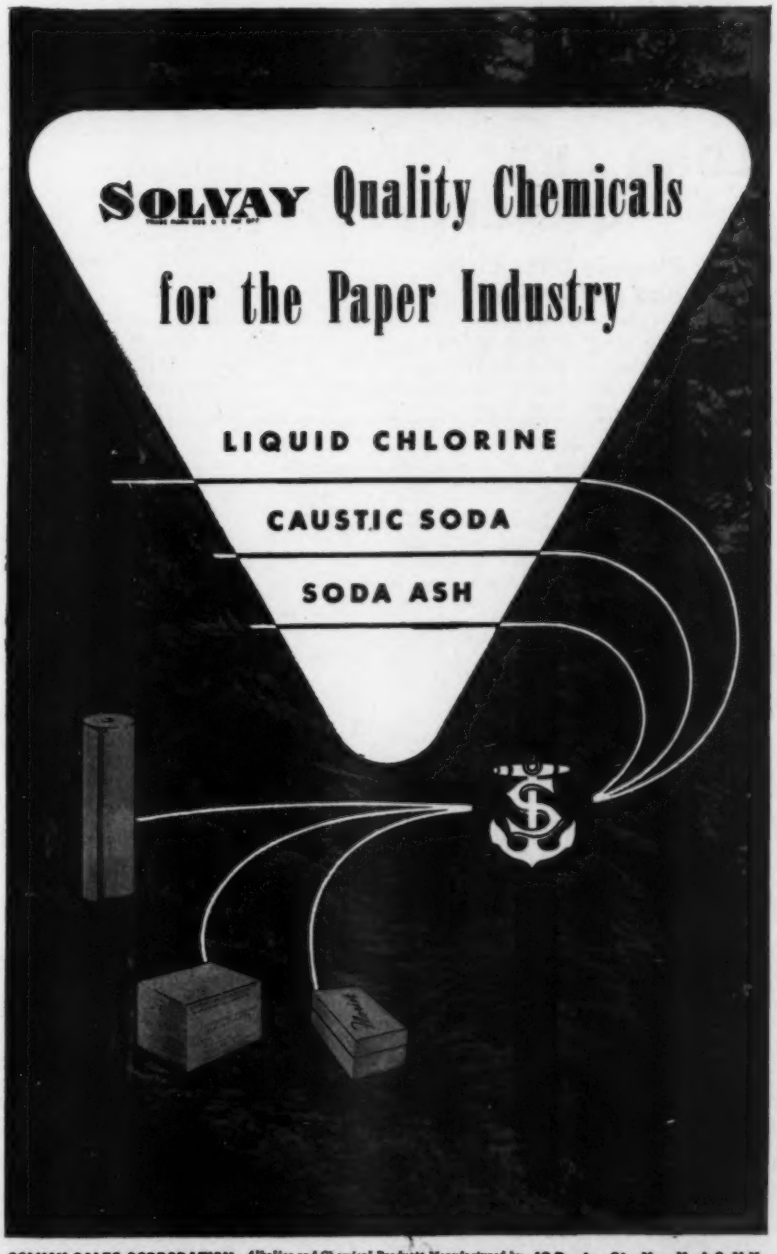
Additional Data on the Recovery Of Wet Pulp Mats from Compressive Deformation

C. O. SEBORG[1], Chemist
F. A. SIMMONDS, Chemist
Forest Products Laboratory[2]

In a previous report (*Paper Trade J.* 109, 8:35-42, August 24, 1939), the recovery from compressive deformation of a bleached southern pine sulphate pulp was shown to have decreased 25 per cent, apparently linearly, as the temperature of the wet mat was increased over the range of 13 to 42 C. The surface tension of the water was not controlled in this instance and, although the change in the value was relatively small, it was necessary to recognize that two variables were undergoing change simultaneously. A study was then made to determine if the effect of these two variables could be isolated. Data were also obtained on both the influence of duration of compression and screen fractions on recovery values. The results of these studies are reported here.

The apparatus and procedure used are essentially the same as previously described. Improvements have been made, however, by providing means for controlling the temperature and eliminating possible side components of force during compression. The latter is achieved by transmitting pressure from a lever through a piston to a ball bearing automatically centered in a plunger in direct contact with the pulp mat. This apparatus is shown in Figure 1. The temperature control apparatus, diagrammed in Figure 2, maintains the selected temperature at 25 C. within ± 0.5 C. This degree of accuracy holds over a range of 11 to 75 C., provided the water entering the heater is at constant temperature. In operation, artesian water at a temperature of 11 to 12 C., available throughout the year, was passed from an adjustable constant level device through the heater and then to the compression apparatus. An occasional slight adjustment of the constant level apparatus offset the small variation in the temperature of the entering water. Temperature control in the 11 to 75 C. range was accomplished by using various sized orifices to regulate the rate of flow

(1) Formerly at the Forest Products Laboratory.
(2) Forest Service, U. S. Department of Agriculture, maintained at Madison, Wis., in co-operation with the University of Wisconsin.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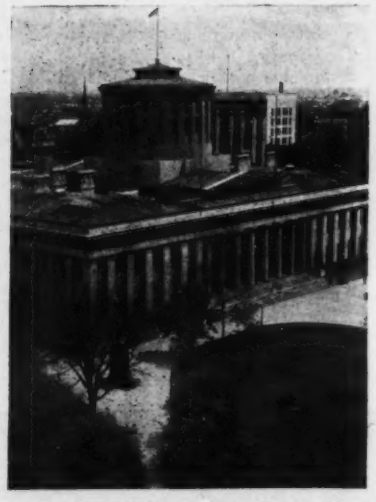

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Fig. 1—Recovery apparatus

of water to the heater. The stream of constant temperature water passed through a copper coil in a hollow plunger of the compression apparatus and overflowed to a diked base, thus keeping both sides of the mat at the desired temperature. Prior to compression, the pulp mats were brought to the desired temperature by conditioning in a constant temperature bath.

The weight of the wet mats prior to pressing was standardized at 50 grams, since this was found to improve repetitive accuracy. In the earlier trials, the weight of the pulp samples on the moisture-free basis was 6 grams. With the improved apparatus it was found that a sample weight of 4 grams could be used satisfactorily. It is thought that as thin a mat as possible should be used.

The surface tension of the effluent obtained when the mats were formed was measured with a DuNouy interfacial tensiometer at a temperature of 25 ± 2 C. The wetting agents "Aerosol OT" and "Nacconal NR" were used to adjust the surface tension.

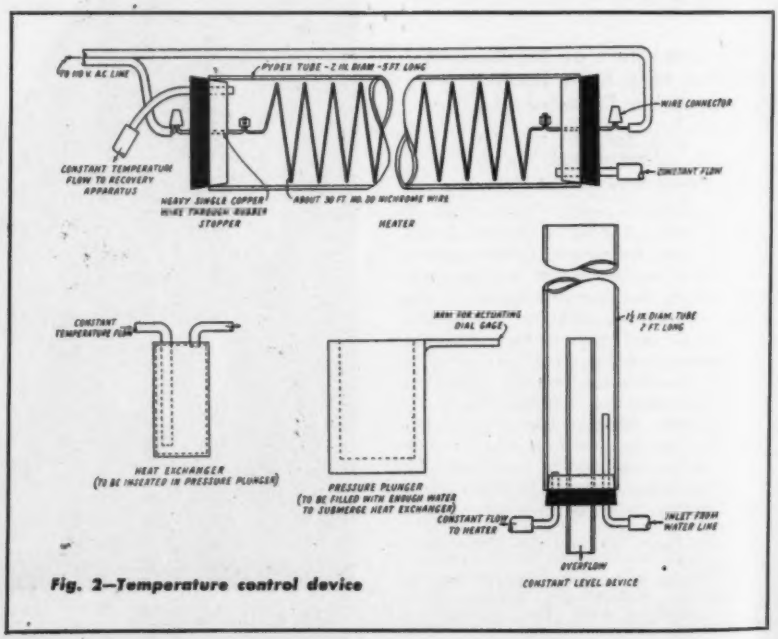
Recovery of pulps and stuffs from compressive deformation was affected by the duration of compression. The longer the mat was pressed, the lower the recovery value, especially in the case of the unbeaten pulps, indicating the effect of plasticity of the fibers.

Recovery values of chemical and mechanical pulps and stuffs which had been classified as to size of fractions showed the large influence of the fraction passing 150-mesh on the recovery of the whole pulp.

It was confirmed that sulphate pulps as a class are higher in recovery than sulphite pulps, and both are higher than groundwood pulps.

The effect of temperature on recovery values is a complex one, being influenced by such factors as surface tension, plasticity, and the physical condition of the fiber surfaces. At constant surface tension and variable temperature there were no consistent trends, recovery values for some pulps increasing with increasing temperature, others decreasing, and some remaining unchanged.

When the surface tension was varied at constant temperature with two different wetting agents, the latter were found to have a direct effect on the recovery characteristics of the pulp itself. This indicates that it will be extremely difficult to determine the exact offset of surface tension on recovery. It was, however, possible to show an increase in recovery at a sufficiently reduced surface tension. The surface tension of the tap water associated with various pulps and stuffs does not vary enough to necessitate control of surface tension in the recovery determination. Beating was found to reduce surface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CONSTANT FLOW
HEAVY SINGLE COPPER WIRE THROUGH RUBBER STOPPER
ABOUT 30 FT. NO. 20 NICHROME WIRE
HEATER
CONSTANT TEMPERATURE FLOW
0-100 LB. RECTIFYING DIAL GAGE
1½ IN. DIAM. TUBE 2 FT. LONG
HEAT EXCHANGER (TO BE INSULATED IN PRESSURE PLUNGER)
PRESSURE PLUNGER (TO BE FILLED WITH ENOUGH WATER TO SUBMERGE HEAT EXCHANGER)
CONSTANT FLOW TO HEATER
INLET FROM WATER LINE
OVERFLOW
CONSTANT LEVEL DEVICE

Fig. 2—Temperature control device

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tension of the associated tap water up to 7 dynes per centimeter.

The shrinkage of mats of unbeaten and beaten pulps upon drying in air decreased with decrease in surface tension, the effect becoming greater as the degree of beating was increased. Adsorption of wetting agent blocking off available surface for fiber-fiber bonds is recognized as a possible second factor in reducing shrinkage.

Agricultural Residue Pulps Comparison with Typical Wood Pulps

S. I. ARONOVSKY,[1] ALAN RHODES,[2] and E. C. LATHROP[3]
Northern Regional Research Laboratory[4]

The importance of the utilization of agricultural residues in the economy of the country is receiving constantly increasing recognition by agriculture and industry. Agricultural residues, including straws, stalks, stems of various types, cobs, hulls, and similar materials constitute approximately two-thirds of the total farm crops, and amount to about 200 million tons (dry basis) annually. (Seventy-sixth Congress, 1st Session. "Regional Research Laboratories, Department of Agriculture," Senate Document No. 65: 51, April 6, 1939). Of the approximately 100 million tons of these residues which might be made available for industrial use, less than 2 million tons, or 2 per cent, is so utilized. This is in sharp contrast with the accomplishment of industry of relatively complete utilization of industrial by-products.

Since the largest proportion of all of the available agricultural residues is lignocellulosic in character and fibrous in structure, the production of pulps and papers appears to offer an outlet for a considerable tonnage of these residues. The Pulp and Paper Section was, therefore, formed in the Agricultural Residues Division of the Northern Regional Research Laboratory to study and attack this problem. (Lathrop, E. C. "Industrial Utilization of Agricultural Residues," *TAPPI Bull.* No. 59, September 24, 1945).

After considerable thought it was decided that the best and soundest approach was to determine the properties and characteristics of the various agricultural residues and the fundamental differences among themselves and between them and other papermaking materials. Then, by capitalizing on the particular properties of these residues it might be possible to establish their rightful place in industry on a utilitarian and economic basis.

In order to determine the value of an improved or new pulp or paper product it must be compared with similar products currently in use. Calibration of the approved modern pulp evaluation equipment assembled at this Laboratory in terms of several "standard" types of widely used commercial wood pulps (standard in the sense that they meet certain minimum specifications) was, therefore, undertaken as one of the first steps in this plan of attack on the agricultural residue pulp problem. The present paper deals with this first step of the program. Several hundred pounds each of various types of these wood pulps were obtained and tested by the standard methods (TAPPI. "Tentative and Official Testing Methods, Recommended Practices, Specifications," Tech. Assn. Pulp and Paper Ind. New York, N. Y.) in use in the pulp and paper industry. A number of agricultural residue pulps was then prepared and tested with the same equipment and methods.

Experimental

The commercial wood pulps included bleached and unbleached softwood sulphite, bleached hardwood sulphite, bleached softwood neutral sulphite, bleached hardwood soda, and unbleached softwood craft. These pulps came from all parts of this country except the deep South.

The agricultural residue pulps were prepared from wheat and rice straws, sugarcane bagasse, flax shives, and hemp hurds. The raw materials were cooked with sodium hydroxide (NaOH) at 170 C. (100 psi). The total liquid-to-solid ratio in the digestion was 8:1. The cooked material was washed with water and screened

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through a 4-cut (0.0004" width slots) laboratory flat screen. The thin fiber suspension discharged from the flat screen was flowed onto a 100-mesh wire cloth, inclined about 30 degrees from the horizontal, which acted as a thickener and at the same time removed pulp fines and particles smaller than 100 mesh. The screened, thickened pulp was pressed to a moisture content of 75-80 per cent prior to sampling for yield data.

The pulp and paper apparatus used in this work included:

(a) Two standard 1.5-pound, Niagara-type beaters, one with the sharp tackle and the other with the roll bars dulled
(b) A vertical beater (Morden)
(c) A pulp fractionator (Bauer-McNett)
(d) Mullen bursting testers
(e) An Elmendorf tear tester
(f) Schopper folding testers
(g) Schopper tensile and stretch testers

The bursting and tensile strength of the agricultural residue pulps used in these studies were as high as, and with wheat straw and hemp hurd pulps higher than those of sulphite wood pulp. The values for the wheat straw and hemp hurd soda pulps approached the bursting and tensile strengths of the northern kraft wood pulp. All of the residue pulps were deficient in tear resistance in comparison with the softwood pulps, but they had slightly higher tear resistance than the hardwood soda pulp.

The fold values for the softwood pulps were higher than those for all of the agricultural pulps with the exception of wheat straw pulp. The latter had slightly greater folding strength than the sulphite pulps, but less than the kraft wood pulps. All of the pulps with the exception of those from hemp hurds and flax shives showed the typical reverse-S freeness curves. There was considerable difference, however, in the rate of freeness reduction of the various pulps.

The outstanding difference between wood and agricultural residue pulps is in rate of hydration, or beating, to attain the maximum strength characteristics. While it required 40 to 60 minutes, using the same beating conditions, to obtain the optimum strength values with the wood pulps, only 20 to 30 minutes were required for the corresponding values with bagasse and wheat straw pulps. This is probably due to the high pentosan or hemicellulose contents of these two pulps as compared with the wood pulps. It is well known that pulps of higher hemicellulose content hydrate more easily, with a consequent saving in power, than do pulps with lower hemicellulose content. The hemp hurd, flax shive, and rice straw pulps, containing less pentosan than the bagasse and wheat straw pulps, thus required longer beating periods to attain their optimum strength values.

The bursting and tensile strengths of the hemp hurd pulp were considerably greater than expected, considering the relative shortness of the average fiber length. No clear explanation for this anomaly can be given at this time.

A significant, but expected, result of dulling the beater roll bars was the general increase in the optimum strength characteristics of the pulps. This was particularly true of the tensile strength and of the bursting strength, which showed an increase of from 1 to 7 points over the corresponding values obtained with the sharp-bar beater. Relatively higher tear resistance values were obtained for the unbleached sulphite pulp with the dulled beater, due, no doubt to the lesser degree of cutting obtained with this beater. The increase in tear values of the agricultural residue pulps was very slight, however, since these pulps had relatively low original tear resistance.

As in the case of the sharp-bar beater, the fold value for the wheat straw pulp was higher than that for the wood sulphite, but all of the other residue pulps had lower values.

The wood sulphite, bagasse, and wheat straw pulps had the typical reverse-S freeness curves, but approximately straight lines were obtained for the other agricultural residue pulps. Since the wood sulphite, bagasse, and wheat straw pulp fibers are longer than those from the flax shive and hemp hurd pulps, it is quite likely that the freeness curves for the latter pulps are mainly the result of hydration, with little or no cutting. Although rice straw fiber has nearly the same average length as wheat straw fiber, it apparently presents a special case. This may be due to its high ash and silica content. Previous work on bleaching rice straw pulp had already shown that its chemical behavior was different from that of the other agricultural residue soda Pulps (Aronovsky, S. I., Nelson, G. H., and Lathrop, E. C. "Agricultural Residue Pulps—Bleaching Studies on Straw Pulps." *Paper Trade J.* 117, No. 25: 38-48, 1943).

The strength and beating curves obtained with the dulled beater appeared to be in about the same order as in the tests with the sharp beater. It is evident that, with the exception of tear resistance, the strength characteristics of the agricultural residue pulps were as good as those of the sulphite wood pulp and that wheat straw soda pulp had even better strength properties. The results on hemp hurds were similar to those obtained with the sharp beater. Dulling the beater roll bars, therefore, had the desired effect of decreasing the rate of beating and strength development without affecting the pulp properties adversely.

The strength properties of the pulps developed with the vertical beater (Morden) were of the same order as, but of lower value than, those obtained with the TAPPI standard beater. Removing the shaft weights resulted in higher strength values for both the wood sulphite and the wheat straw pulps. The strength characteristics of the wheat straw pulp were better, except for tear resistance, than those of the sulphite wood pulp. Compared with the kraft wood pulp, only the bursting strength and tear resistance values of the wheat straw pulp were inferior.

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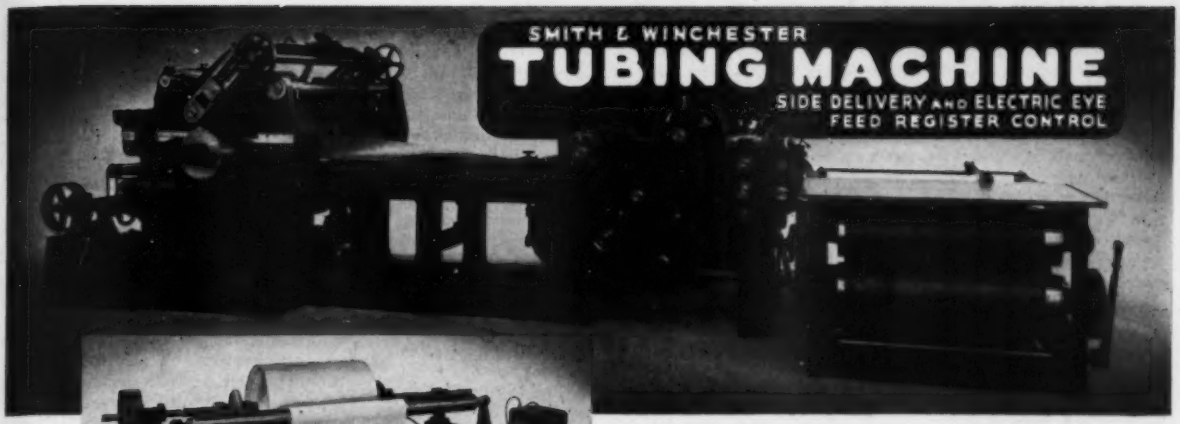

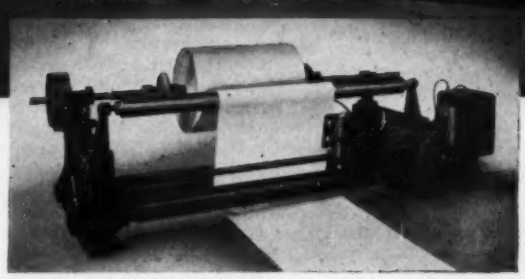

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The wheat straw pulp was superior to the wood soda pulp in all of the strength properties measured. Here again the greater ease of hydration of the wheat straw pulp was evident.

Multi-batch beating of bagasse, flax shive, hemp hurd, and rice straw soda pulps gave results comparable to those obtained with the dulled standard beater. The beating and strength characteristics of all of these residue pulps, with the exception of hemp hurd pulp, were distinctly inferior to those of wheat straw pulp. The hemp hurd product excelled the wheat straw pulp only in tensile strength under these beating conditions.

The wood and agricultural residue pulps were fractionated, at several stages during the bearing, in the 4-compartment Bauer-McNett classifier, using screen mesh combinations of 14-28-65-100, 20-35-65-150, and 35-65-150-200. Samples for fractionation were taken at the beginning of each beater run and at approximately 800, 700, 500, and 300 cc. Schopper-Riegler freeness, and freeness determinations were made at each sampling.

Generally, under the same conditions of beating and at the same freeness, larger proportions of the long-fibered pulps are retained on the coarser screens, and that the longer the original fiber the greater is the amount retained. The results with the sulphite and kraft wood pulps confirm the fact that the sharp-tackle beater did more cutting than the dulled beater.

The lower strength characteristics developed with the Morden beater (with the shaft weights in place) may be due, in part, to the greater degree of cutting of the fiber by this machine. Data for the flax shive and rice straw pulps indicate decreased cutting of the fiber by the Morden beater when the shaft weights were removed.

In general, these data on agricultural residue pulps, obtained with the same equipment and techniques used for the wood pulps, show that the farm residue pulps compare favorably with the wood pulps in all of the strength characteristics except tear resistance. The residue fibers are shorter than coniferous wood fibers but they are considerably smaller in diameter than the wood fibers. The farm residue pulps contain larger amounts of pentosans, and hence they hydrate more readily. These beating and strength development characteristics of the agricultural residue pulps indicate that they would be desirable and useful for specialty products.

Influence of Sodium Sulphite And Sodium Triosulphate in The Sulphate Pulping of Englemann Spruce

MARK W. BRAY[1] and BERNARD SINGER[2]
Forest Products Laboratory[3]

The Engelmann spruce (*Picea engelmannii*) pulpwood used in these pulping experiments, consisting of six 4-foot bolts, was selected from a single tree cut in Montana.

The chemical analysis of the wood indicated it to be in a sound condition and presaged normal yields of pulp on the weight basis, but the comparatively low specific gravity of the wood indicated low yields on the basis of wood volume. The high percentage of springwood in this material is normal for northern grown conifers and indicates the possibility of relatively high bursting and tensile strength pulps. The presence of compression wood, however, would have some adverse effect on pulp strength (Pillow M. Y., and Bray, M. W., *Paper Trade J.*, 101, 26, 31, December 26, 1935).

Experimental Procedure

After the wood was chipped, the over- and under-size material was removed on shaker screens. A sufficient quantity of ⅜-inch chips was prepared from the hand-peeled bolts to accommodate all the pulping experiments. The chips were thoroughly mixed and stored in covered cans at 40 Fahr. and 93 per cent relative humidity so that all digestions could be made on uniform material.

The digestions were made with an equivalent of 4 pounds of moisture-free chips in 3.7 gallons (½ cubic foot) capacity spherical, rotary, autoclaves heated indirectly with steam. A linear temperature-increase schedule was followed, allowing 1.5 hours to raise the temperature of the digester from 30 C. to the maxi-

(1) Chemist, (2) Collaborator, (3) Forest Service, U. S. Department of Agriculture, maintained at Madison, Wisconsin, in co-operation with the University Wisconsin.

mum cooking temperature, 170 C., where it was held constant for 1.5 hours. At the end of the cooking period the pressure in the autoclave was rapidly reduced to atmospheric pressure by releasing steam from the jacket and replacing it with cold water. Spent liquor samples were taken, and the pulped chips were dumped into screen boxes, washed, broken up in a small vat by rapid agitation in water, and screened through a 12-cut flat screen. The screened pulp was pressed, weighed, and sampled for moisture. Data on chemicals charged and consumed, liquor volumes, and pulp yields were calculated to the moisture-free equivalent of chips charged.

Description of Pulping Experiments

The following summarizes the digestions made in this work:

Digestion 1520, caustic soda only, using 20 per cent of caustic soda based on moisture-free wood at an initial concentration of 50 grams per liter.

Digestion 1523, a sulphate cook, using the ratio of 2 parts of caustic soda to 1 part of sodium sulphide.

Digestion 1525, an alkaline sodium sulphite cook in which the amount of sodium sulphide used in Digestion 1523 was replaced by an equivalent amount (on the basis of reducing power) of sodium sulphite.

Digestion 1527, an alkaline sodium thiosulphate cook, in which the amount of sodium sulphide used in Digestion 1523 was replaced by an equivalent amount (on the basis of reducing power) of sodium thiosulphate.

Digestion 1529, a sulphate digestion in which one-half of the amount of sodium sulphide used in Digestion 1523 was replaced by an equivalent amount (based on reducing power) of sodium sulphite.

Digestion 1531, a sulphate digestion, with twice the reducing power of sulphate Digestion 1523. For this digestion sodium sulphite was added in an amount equivalent to the reducing power of the sodium sulphide used in sulphate Digestion 1523.

Digestion 1528, a sulphate digestion in which one-half of the amount of sodium sulphide used in Digestion 1523 was replaced by an equivalent amount (based on reducing power) of sodium thiosulphate.

Digestion 1530, a sulphate digestion, with twice the reducing power of sulphate Digestion 1523. For this digestion, sodium thiosulphate was added in an amount equivalent to the reducing power of the sodium sulphide used in Digestion 1523.

Method of Testing the Pulps

The strength properties of the pulps were determined by testing sheets prepared from material processed in a 1.5-pound standard testing beater according to TAPPI Standard Method, T200m-40, which, at the time, specified a 6,500-gram weight on the lever-arm of the bedplate. Bleaching tests were made on the pulps by treating 15-gram samples in a single stage with varied percentages of calcium hypochlorite solution. The color of the bleached and unbleached pulps was measured with a reflectometer calibrated in accordance with TAPPI method, T217m-42. The unbleached pulps were chemically analyzed for their cellulose, alpha cellulose, lignin, and pentosan contents and for their chlorine requirements according to standard TAPPI methods. Bleach consumption and the results of chemical analysis of the pulps are based on the weight of moisture-free pulp tested.

Conclusions

The data obtained in these pulping experiments on Engelmann spruce showed that the addition to either sodium sulphite or sodium thiosulphate to caustic soda cooking liquor increases the rate of pulping, reduces the percentage of screen rejects, and improves all the strength properties and bleach requirements of the pulps. However, in conformance with their reducing power as indicated by their single potentials, these chemicals are inferior to sodium sulphide when used alone with caustic soda both as to rate of pulping and quality of product.

The use of these chemicals in combination with sulphate cooking liquor, that is, caustic soda and sodium sulphide, gives further improvement in the rate of pulping and greatly increases the strength properties of the resulting pulps.

From the favorable results obtained with sodium thiosulphate, it may be deduced that any of this chemical formed in the reactions between caustic soda and sulphur in the soda-sulphur pulping process is available as an effective pulping agent and has a beneficial effect on pulp quality. The results also suggest use for the residual sodium sulphite in the spent liquors of the neutral sulphite semichemical process by using the liquor as a diluent for the strong white liquor in the sulphate pulping process.

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Pulping with Sodium Sulphite To Produce Strawboard

S. I. ARONOVSKY,[1] A. J. ERNST,[2] and H. M. SUTCLIFFE[3]
Northern Regional Research Laboratory[4]

The pulping of straw and other agricultural fibers with sodium sulphite was patented by Cross (Brit. 4984, 1930) in England in 1930, and by Schact (Ger. 122, 171, 1900) in Germany in 1900. Drewson (U. S. 1,229,422, June 12, 1917) obtained a U. S. patent on pulping agricultural residues in 1917, and a number of patents and articles in this field have been recorded in the literature since that time (Braun, C. A., U. S. 1,387,441, August 9, 1921); (Clark, J. d'A., *World's Paper Trade Rev.*, 85, 1522, 1926); (Drewsen, V., *Paper Trade J.*, 83, No. 24, 41, December 9, 1926); (Hausen, J., *Ibid.*, 84, No. 9, 51, March 3, 1927). When sodium sulphite was used to replace lime in pulping straw for the manufacture of strawboard, the product had consider-

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ably less odor than the lime-cooked material (Rue, J. D., and Monsson, W. H., *Paper Trade J.*, 81, No. 15, 52, October 8, 1925), and somewhat better strength and operating properties.

In spite of these seeming advantages, however, sodium sulphite has not been used to any great extent in the commercial production of strawboard, mainly because of its relatively high cost. The market price of this chemical in the late 1920's was 6 to 7 cents a pound on the basis of the dry salt, a prohibitive figure. By manufacturing this chemical in the pulp mill proper from soda ash and sulphur, its costs could be brought down into a range roughly comparable with that of caustic soda. This procedure, however, is economically feasible only for relatively large-scale operation, as in the commercial production of wood pulps where large amounts of sodium sulphite are required for pulping. The chemical requirements of the average strawboard mill are relatively small and manufacture of the necessary sodium sulphite at the mill would not, therefore, be economical.

Recent work at the Northern Regional Research Laboratory has dealt with the correlation of the effects of various pulping processes for the production of fine specialty pulps from agricultural residues (unpublished data). The results indicate that sodium sulphite pulping has a number of advantages over the other processes for delignification of these raw materials. This fact, coupled with the recent information that technical anhydrous sodium sulphite is available at reasonably low cost, as a by-product of the chemical industry, led to the re-examination of the possibilities of this chemical for strawboard production. After this work was begun, it was learned that several strawboard mills had made commercial-scale trial runs on straw with the technical sulphite. The results of these trials, while promising, were inconclusive, owing to the inability to determine with a fair degree of accuracy, under the conditions of these tests, such data as yield, ease of hydration, optimum strength properties, and so on.

Although the Northern Laboratory's data on sodium sulphite pulping for strawboard production are still incomplete, it is felt that the acute interest of the strawboard industry in this process warrants presentation of the preliminary results at this time.

The raw material was a bright, sound combine straw, relatively free from chaff, and from soft winter wheat grown in central Illinois in 1945. The methods of pulping and of pulp evaluation used in this work have been described in previous reports (Aronovsky, S. I., Younger, J. O., and Nelson, G. H., *Paper Trade J.*, 120, No. 8, 124, February 22, 1945); (Younger, J. O., and Aronovsky, S. I., *Ibid.*, 120, No. 19, 43, 1945).

With increase in sodium sulphite from 2 to 6 per cent, the yields of washed pulps, and total yields as well, decreased somewhat; the strength properties and density increased; and the freeness was apparently unaffected. The most noticeable characteristic of these sodium sulphite pulps is the high freeness at maximum Mullen (in cooks 535 and 541 the beating was stopped at 150 minutes although the bursting strength values were still rising slowly), and the long beating periods required. These effects, in somewhat lesser degree, had also been observed in preparing fine chemical pulps from straw with sodium sulphite. The low bursting strengths of the sodium sulphite strawboard pulps are probably tied in closely with the relatively low pH values of the spent pulping liquors. Previous work on pulping straw with this chemical had shown that when the pH of the used liquor was substantially below 6, the resultant pulp fibers were brasher and more difficult to hydrate. This resulted in weaker fiber-to-fiber bonding and, consequently, in lower bursting and tensile strengths than are usually obtained with pulps produced under neutral or slightly alkaline conditions (unpublished data).

In the mill-scale trials previously referred to, promising results were produced by cooking the straw with a mixture of lime and sodium sulphite. The optimum cooking mixture in these commercial runs, as indicated by observation of the washing characteristics of the pulp and its operating characteristics on the paper machine, consisted of 1.25 per cent sodium sulphite, 4 per cent lime and 1.25 per cent sodium carbonate. Based on this information, a number of laboratory cooks

(Turn to page 286)

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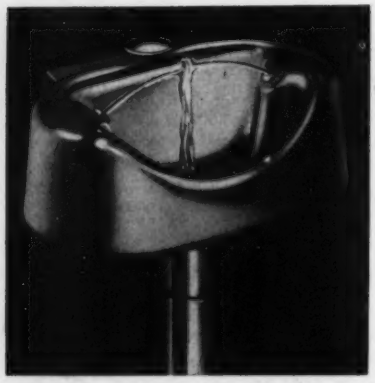
NEW EQUIPMENT AND SUPPLIES

Eye Washing Fountain

Benson & Associates, Inc., 332 South Michigan Ave., Chicago 4, Ill., have announced the development of an eye washing fountain for the flushing of eyes that have been exposed to irritating vapors, chemical liquids, dusts, or smoke.

The fountain is essentially a double washer with standard inlet and drainage connections. The openings are so ar-

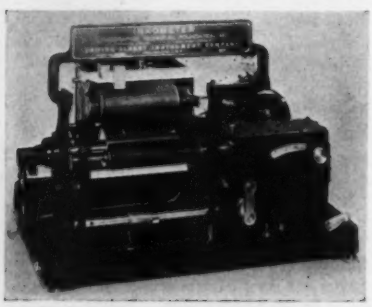


ranged that two streams of water are directed simultaneously against the eyes. Water pressure can be regulated so that a soft stream is produced—assuring a copious but easy flow.

The bowl, designed to fit the upper contours of the face, is of cast aluminum. The actuating valve is operated by simply resting the head on the upper portion of the bowl. A pressure regulator is built into the actuating valve.

Ink Film Dynamometer

Thwing-Albert Instrument Co., Penn St. and Pulaski Ave., Philadelphia 44, Pa., has announced the development of an instrument for measuring the tack of ink while the ink is in a state of agitation comparable to that which takes place in the various printing processes. Desig-



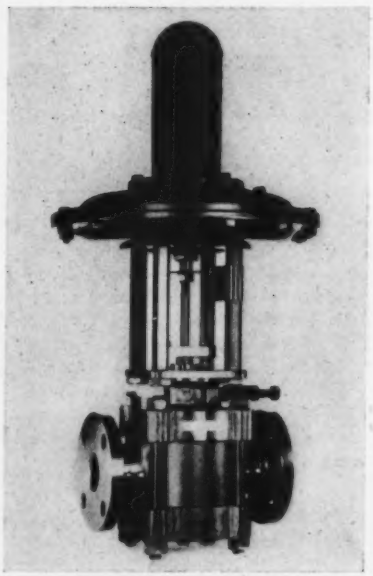
nated as the new C-46 Inkometer, the original Inkometer having been developed by the Lithographic Technical Foundation, this instrument in operation simulates press speeds. At positive settings, the three-speed transmission produces speeds of 400, 1200 and 2000 rpm, or peripheral speeds of 314, 942, and 1570 fpm.

In making a test, a delicately balanced pendulum involving a hollow brass roller and a composition roller is first "zeroed" without ink. Then, an ink sample of standard volume is applied to the rollers and the resistance measured through appropriate linkage by a sliding weight on a scale beam.

The desired temperature standards are maintained by circulating water from a thermoregulated bath through the hollow brass roller. The composition rollers, which are easily changed, may be coated with whatever material is used on the ink rollers of the presses.

Chemical Service Diaphragm Motor Valve

A new design of diaphragm motor valve for chemical service applications, designated as the *Valvrator*, has been announced by the Fischer & Porter Company, Hatboro, Pa. This valve features dished bonnet construction with flush-



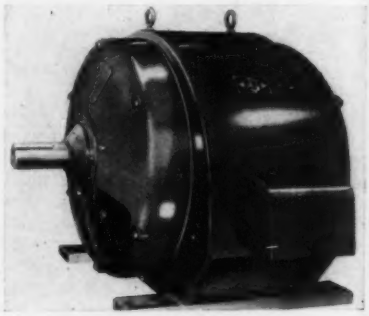
seated bodies and through-bolts. No bonnet flanges are included in the body construction.

The valve is made only in 150 lb. construction in sizes from ¼ to one-inch screwed, and from one to three-inch flanged.

Body materials such as iron, bronze, stainless steel, carbon steel, hard lead, Haveg, hard rubber, Monel, nickel, Hastelloy and porcelain are regularly available.

Induction Motors—100 to 1000 hp.

Electric Machinery Mfg. Company, Minneapolis 13, Minnesota, has announced a line of squirrel cage induction motors, under the designation of "Heavy-Duty," which includes motor sizes from 100 to 1000 hp., and speeds of 1800 rpm and lower. The motors, of drip- and splash-proof construction, utilize fabricated steel frames. Inspection and blowing out on larger ratings is simplified with access plates designed for speedy removal and



replacement. Sealed bearings can be cleaned and refilled without motor disassembly. Motors are provided with double end ventilation—a blower being located on each end of the individual motor rotor. Starting characteristics are NEMA Class B (normal torque, low starting current), for across-the-line starting.

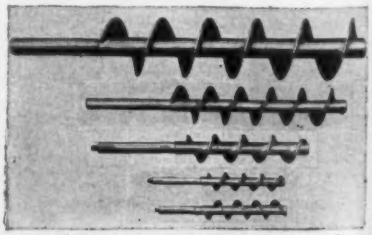
New Coating for Paper

A new series of technical coatings, designated as *VINYLITE Organosols*, has been announced by the Watson-Standard Co., Pittsburgh 12, Pa. Highly resistant to water, grease, oil, chemicals, heat, etc., the coatings are chemically inert, nontoxic, tasteless and may be heat-sealed. The finishes are prescription compounded and produced in brilliant colors or water clear. They impart an attractive high gloss surface that is free from creases and cracks. Paper table cloths, food packages and other containers represent typical applications.

VINYLITE is a trade mark of Bakelite Corporation and its use is sanctioned by the copyright owner.

Screw Conveyor of Welded Design

D. J. Murray Manufacturing Company, Wausau, Wis., has announced a screw conveyor, under the trade name *Murco*, which is of welded construction. The



conveyor is made in stainless steel and other metals, and in various diameters, lengths, and pitch, according to customer specifications.

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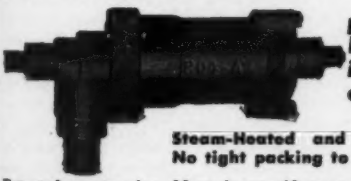

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Single Color Offset Press

Harris-Seybold Company, Cleveland 5, Ohio, has announced a new single color offset press. Designated as LTN 22 x 34, the press is capable of speeds up to 6000 impressions per hour. Features of the new design, cited by the manufacturer, include more efficient ink distribution, more positive register, and improved feeding and delivery mechanisms.

Corrosion-Resisting Heat Exchanger

A new design of heat exchanger, claimed to be especially serviceable for efficiently heating or cooling small quantities of corrosive solutions over a wide temperature range, has been announced by The Duriron Company, Inc., Dayton 1, Ohio. The No. 4 size, first of the line, handles an acid flow of from four to 14 gpm, with a heating capacity up to 155,000 Btu per hour with 75 lb. steam and inlet temperature of liquid between 70 and 130 Fahr., and a cooling capacity up to 90,000 Btu per hour, based upon 100 deg. Fahr. mean temperature differential. Larger sized units are being developed. The No. 4 unit, however, can be connected in series or parallel, thus permitting it to meet a wide variety of heat transfer problems.

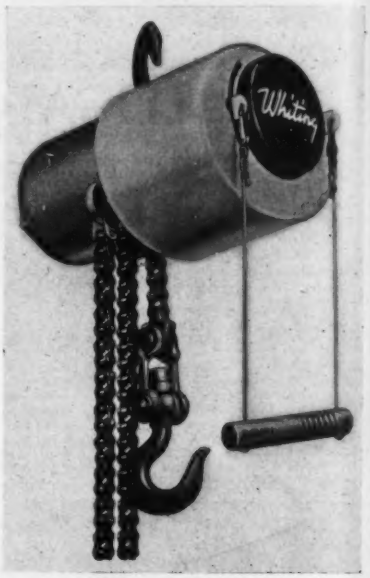
Among the features cited by the manufacturer for the exchanger are: separation of steam or coolant from the corrosive solution by a Duriron tube, vertical or horizontal installation, no packing against corrosive solution and removal of parts without disturbing steam or coolant inlet and outlet connections.

Portable Electric Hoist

A roller chain electric hoist, made in capacities of ¼, ½, and one-ton, has been announced by the Whiting Corporation, Harvey, Illinois. The hoist utilizes a double-reduction, totally-enclosed, worm-gear drive. Ball bearings are used throughout.

The hoist frame is a steel casting. A patented self-energizing motor brake, which does not require adjustment, interlocks with the controller to provide safe operation. Upper and lower safety limit switches are provided.

The load hook has a universal action and swivels on ball bearings. Control is by means of a single bar grip, which can



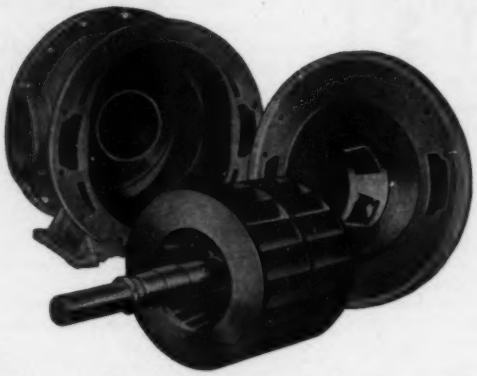
be operated by one hand, allowing the other hand to be free to steady the load.

The hoist can be operated in an inverted position. The load, in such a case, is attached directly to the hoist rather than to the hook on the roller chain.

Accordion-Type of Portable Gravity Conveyor

A portable gravity conveyor, so flexible that it can be extended from 35 in. to 100 in. per unit, has been announced by the Riverside, California Division of the Food Machinery Corporation. The conveyor is easily set up, is capable of being formed quickly into practically any shape required, and can be moved from one location to another by simply closing up the unit, turning it over, and using the rollers as wheels. The unit is designated as the Accordion Conveyor.

SIMPLICITY



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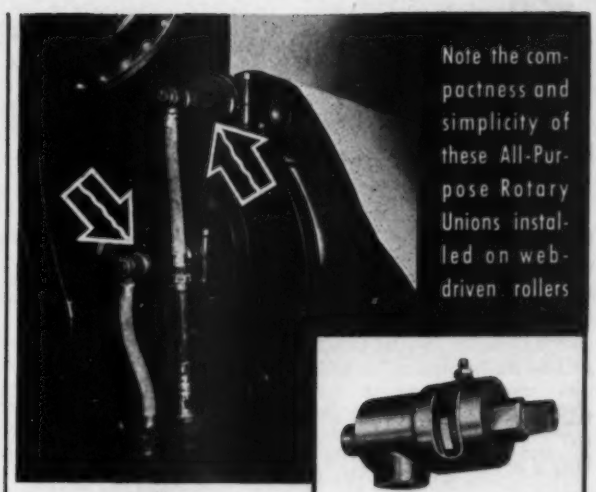

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TECHNICAL DEVELOPMENTS

These abstracts are of the latest developments found in the American and foreign press.

Swamp Vegetation and Papermaking Cellulose

The author describes the popular plantations in the Chautagne region in the district of Savoy. The trees were planted in 1934, and the species found most suitable to the swampy region and which are also good papermaking material are *Populus angulate cordata robusta*. A schematic panorama and the geology of the area are given. A. Matagrin. *Papeterie*, 68, No. 5, 136-9; 141-2 (1946) (in French).

Colorimetric Determination of Sulphite Waste Liquor

A quantitative method for the determination of sulphite waste liquor is based on the fact that, in alkaline solution, the liquor reacts with the phosphotungstic-molybdenum reagent to give a blue coloration, the intensity of which increases with the concentration of the solution. The content of the waste liquor that can be detected ranges from 0.001% to 0.025% with the optimum range between 0.001 and 0.01%.

The method can be used for liquors that have been dried, as well as in the form of solution. Temperature changes between 15 and 30 deg. C. do not affect the color. The determination, which only requires 15-30 minutes, is as follows: Five milliliters of the sulphite waste liquor are mixed with 5 ml. of the P-W-MO reagent in a 50 ml. cylinder. After 5 minutes, 40 ml. of a saturated soda solution are added, and the well mixed solution allowed to stand 10 minutes. The blue color is then measured colorimetrically and compared with known standards. B. S. Zaidenberg. *Legkaya Prom.* 1946 No 7/8 35. Through C.A. 41,2241 (1947).

Hardwoods for Newsprint

The method proposes to use up to 40% birch and poplar in a newsprint sheet without sacrificing quality. Thus 10% poplar is used as groundwood pulp; 30% birch is used as semi-bleached kraft, and the remaining 60% is spruce and balsam mechanical pulp. The poplar acts largely as filler. The spruce and balsam give a good free mechanical pulp and the birch supplies a fiber that tends to improve the color and printing quality of the sheet.

Poplar should be ground within six months after cutting. Birch is not to be recommended for groundwood (although small percentages have been used). Kraft pulp is recommended because it is stronger than sulphite and because the use of birch in quantity would in any case involve some bleaching operation. Furthermore the kraft process for beech also minimizes the barking problem which is complicated in the case of hardwoods. Hydraulic barking of these woods should be advantageous. Semi-chemical birch pulps are not satisfactory in newsprint manufacture because subsequent expensive bleaching operations would be required. Furthermore, the bleached kraft pulps would be the stronger of the two. The maximum strength potential is gained from the birch semi-bleached kraft pulps, which also have excellent drainage properties. Birch should be used within a year after cutting, and should be stored separately and not allowed to accumulate.

Whereas the cost of this poplar-birch-coniferous sheet would not be much less than ordinary newsprint, hardwood utilization would balance company cuttings and would tend to conserve coniferous pulpwood supplies. Calculations and density figures and 12 references are given. George E. Shipman. Pulp Paper Mag. Canada 47, No 13, 93-7 (December 1946).

Defibration of Vegetable Parchment

After reviewing the attempts made in the past to separate fibers from parchment paper, and after outlining the difficulties that were encountered, the authors describe a series of experiments, in which they used mechanical defibration, cuprammonium solution of the cellulose gel, as well as hydrolysis and esterification of the gel, and the action of various oxidizing agents on the parchment. Most of these defibration attempts were not practical. However the following two procedures gave satisfactory results. In a 250 cc. Erlenmeyer flask provided with a stopper carrying a drawn-out tube, there is placed 2 grams of the sample and 50 cc. of the stock solution. The latter is made up by dissolving 10 g. potassium permanganate and 1 g. sodium hydroxide in 500 cc. water. The mixture in the flask is heated to boiling very cautiously so that the heat can be removed as soon as the mixture foams violently (and the froth fills the flask). Thereupon water is added and the mixture decanted as far as possible from precipitated manganese dioxide. The dark-colored fibers are bleached by adding acetic acid and sodium bisulphite, and by heating the aqueous suspension cautiously and washing with water. The residue is then defibrated simply by shaking in a stoppered test tube. If American vulcanized fiber is to be examined, the sample is cut into strips 1 cm. in length and the various layers are separated from each other by means of a scalpel. A 2 gram sample is then boiled with 50 cc. of an aqueous solution containing 2.5 g. ammonium persulphate until the sample disintegrates. The residue is then rinsed with water and with 3% sodium carbonate solution, and defibrated in a test tube. Sixteen references are given. Doulat and Jean Chiaverina. *Papier* 46, No 6, 269-72 (1943) (In French).

Automatic Wire Guide For Papermachines

An automatically, hydraulically controlled guide for the wire of the fourdrinier is described. This was developed by Ross M. Black for paper machines of the newsprint mill at Powell River, British Columbia.

The device has been in successful operation for over a year. Essentially, it is a horizontal hydraulic cylinder which serves as a slide base for the guide roll bearing saddle. A projection on the bottom of the saddle extends through the slide, through a slot in the cylinder, into a hole in the piston.

The piston is positioned by means of water admitted to either end of the cylinder, under control of a pilot system. This pilot system, in turn, is controlled by the action of a small water jet located at the edge of the fourdrinier wire. If the wire tends to move sideways (i.e., across the machine, either away from or into the guide jet), the action of the pilot system moves the cylinder in the proper direction to move the guide roll very slightly, so as to return the wire to its proper tracking position.

The article (which is anonymous) gives a diagram giving details of the construction of the guide, for which patent application has been made. Chem. Met. Eng. 53, No. 7, 139-40 (1946) through Bull. Inst. Paper Chem. 17, 71 (1946).

Pulping with Sodium Sulphite

(Continued from page 281)

were made with this and other mixtures of these chemicals.

The best pulp in this series of cooks was obtained by using 2 per cent lime and 2 per cent sodium sulphite. The addition of 0.5 per cent sulphur to this pulping formula gave a pulp with poorer hydration characteristics, lower bursting and tensile strengths and density, but better tear resistance; doubling the sulphur content decreased the tear value and increased the other strength properties.

The sodium sulphite and lime-sulphite pulps had in general, a lighter color than the lime-caustic pulp. Probably the most interesting characteristics of the lime-sodium sulphite pulps are the relatively high freeness and lower density values at maximum Mullen strength.

It would appear that these properties would make the lime-sulphite cooked pulps quite attractive; the faster draining pulp would result in a more porous, faster drying corrugating straw paper, which could thus be manufactured at a higher production rate. The lower density of the paper would result in producing more paper per unit of pulp. This could be accomplished, in accordance with the above data, without sacrifice in yield of pulp and with an appreciable gain in strength characteristics. It must be noted, however, that more beating, and, therefore, more power, is required to hydrate the lime-sodium sulphite pulps to obtain their maximum bursting strengths. The increased freeness and lower hydration rate of this type of strawboard pulp were also noted in the commercial-scale trials.

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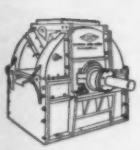

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Frank A. Clarke

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Inquiries should be addressed to James Atkins, Munsey Building, Washington 4, D. C.

Means for Absorbing Relief Gases From Sulphite Pulp Digesters

Patent No. 2,402,895. Jacob Darre Jenssen, New York, N. Y., assignor to G. D. Jenssen Company, Incorporated, New York, N. Y. Application June 17, 1944, Serial No. 540,878. In Canada March 12, 1943. 1 Claim. (Cl. 92—7.)

In means for absorbing relief gases from sulphite pulp digesters, a digester having feed lines to a cooler and a hot acid tank respectively, a return pipe connection from the hot acid tank to the feed line between the digester and the cooler, a feed line from the cooler to a pressure absorption tower, the latter having a feed line to a gas holder, an acid storage tank having a feed connection leading from the pressure absorption tower and a return connection thereto through a circulation pump, a feed line from the acid storage tank to the gas holder controlled by reducing valves, a low pressure absorption tower having a feed line from the acid storage tank and the gas holder and a return pipe to the pressure absorption tower, a sulphur dioxide plant connected to the gas holder and to the low pressure absorption tower, and a bisulphite acid making system connected to said sulphur dioxide plant and to the low pressure absorption tower.

Method and Apparatus for Producing Designed Papers

Patent No. 2,403,461. Edward W. Samson, Erie, Pa., assignor to Hammermill Paper Company, Erie, Pa., a corporation of Pennsylvania. Application November 1, 1940, Serial No. 363,809. 23 Claims. (Cl. 8—7.)

1. A method of producing a two-tone design on paper which comprises subjecting the paper to a combined pressing and rubbing action at selected points conforming with the desired design, the rubbing being effected by slight relative slippage between a surface carrying the desired design and a cooperating surface of the paper, said rubbing being so effected as not to roughen the surface of the paper perceptibly, and subsequently developing the design by the application of a dye to the surface of the paper.

Process for Coating Sheet Materials

Patent No. 2,402,903. Peter J. Massey and Lothian M. Burgess, Chicago, Ill., assignors to H. P. Smith Paper Company, Chicago, Ill., a corporation of Illinois. No Drawing. Application September 27, 1944, Serial No. 556,094. 5 Claims. (Cl. 117—168.)

1. The method of applying an aluminum higher fatty acid soap-wax jell to sheet material at a substantially constant viscosity to provide a non-penetrating laminant which comprises preparing a concentrated jell of said components by heating and mixing said components together, cooling the concentrate immediately after its preparation to render it storage stable, and then continuously dispersing the concentrated jell in regulated proportions into preheated wax and continuously withdrawing and applying the resultant dispersion to a surface of the sheet material.

Papermaking Machine Press Section

Patent No. 2,404,946. Everett W. Clem, Shrewsbury, Mass., assignor to Rice Barton Corporation, Worcester, Mass., a corporation of Massachusetts. Application December 3, 1943, Serial No. 512,757. 6 Claims. (Cl. 92—49.)

1. A paper making machine press roll assembly comprising a movable pressure roll and an associated roll arranged to contact peripherally with their axes in parallel and near a horizontal plane, two pivoted levers beneath the ends of the pressure roll, bearing supports for the pressure roll carried on the upper ends of the levers, pivotal supports for the levers having a common axis beneath the pressure roll and providing for a substantially horizontal swinging movement of the roll, fluid pressure actuated piston and cylinder mechanism connected to swing each lever and move the pressure roll laterally in either direction and a fluid pressure delivery system including a control device to cause said swinging movement and to hold the rolls in contact under a desired pressure.

Apparatus for Distributing Stock to the Cylinder of Paper Machines

Patent No. 2,399,546. Jacob Edge, Downingtown, Pa., assignor to Downingtown Manufacturing Company, Downingtown, Pa., a corporation of Pennsylvania. Application August 20, 1942, Serial No. 455,500. 5 Claims. (Cl. 92—46.)

1. An apparatus for controlling the supply of an aqueous dispersion of stock to a cylinder paper machine vat, comprising a circulating system for said dispersion including a conduit for said aqueous dispersion, and means for maintaining said conduit full of said aqueous dispersion in motion under a predetermined pressure at all times; a white water circulating system including said vat, a white water conduit disposed in laterally abutting relation to said aqueous dispersion conduit, and means for maintaining said white water conduit full of said white water with said white water in motion through said white water conduit under predetermined pressure lower than the pressure of said aqueous dispersion in said aqueous dispersion conduit at all times; said conduits being directly connected by a short passage substantially perpendicular to the axes of said conduits and affording direct intercommunication therebetween; and a plate-like valve element operable transversely of said passage and of a thickness substantially corresponding to the total axial length of said passage to cause the opposite faces of said valve element at all times to be engaged and kept in a wet condition free of accumulations of said stock constantly by said aqueous dispersion and said white water being maintained in active circulation through said conduits respectively.

Design for Wrapping Paper or the Like

Patent No. 144,511. Ernest A. Messenger, Chicago, Ill., assignor to Consolidated Cosmetics, Chicago, Ill., a partnership composed of James L. Younghusband, Howard Younghusband and Paul Rowatt. Application September 13, 1945, Serial No. 122,056. Term of patent 14 years. (Cl. D59—2.)

The ornamental design for wrapping paper or the like, substantially as shown and described.

Apparatus for Coating Paper

Patent No. 2,398,843. Gerald D. Muggleton, Appleton, and Albert F. Piepenberg, Combined Locks, Wis., assignors, by mesne assignments, to Combined Locks Paper Co., Combined Locks, Wis., a corporation of Delaware. Application July 11, 1942, Serial No. 450,550. 5 Claims. (Cl. 91—49.)

1. An apparatus for coating paper comprising a pair of rolls, a metering roll cooperable with the descending side of the upper of said pair of rolls, means for supplying liquid coating material to the nip between the metering roll and the upper of said rolls, whereby a measured film of liquid coating material is applied to the descending side of the upper of said rolls and a distributing roll also cooperable with the descending side of the upper of said rolls below the metering roll, the periphery of the distributing roll having a multiplicity of indentations of uniform design with the indentations staggered with respect to perpendicular planes parallel to the machine direction so as to avoid surface tension ridges in the film of coating carried by the descending side of the upper of said pair of rolls.

Conductive Paper

Patent No. 2,400,544. Bernard L. Kline, Manhasset, and Curt E. Mobius, Brooklyn, N. Y., assignors to The Western Union Telegraph Company, New York, N. Y., a corporation of New York. No Drawing. Application October 24, 1944, Serial No. 560,194. 3 Claims. (Cl. 92—3.)

1. A conducting paper comprising a fibrous body containing a mixture of finely divided metal particles and a stearic acid ester of diethylene glycol dispersed throughout said fibrous body, said ester promoting conductive intimacy of said metal particles.

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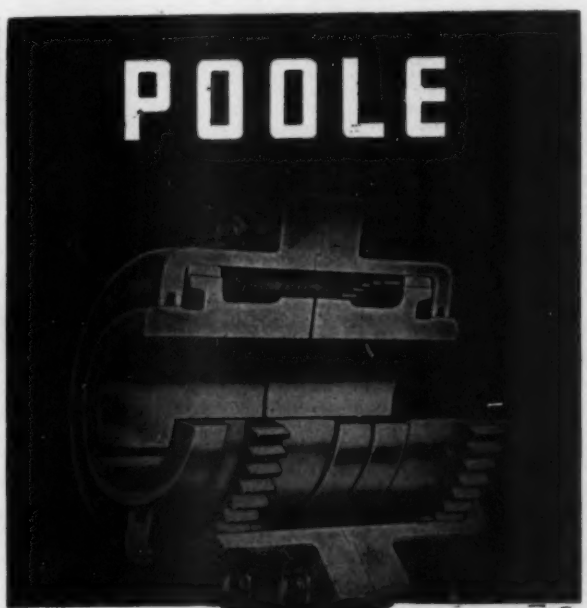

A COPY OF CATALOG GIVING FULL DESCRIPTION AND ENGINEERING DATA SENT UPON REQUEST.

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New Catalogues and Publications

Allis-Chalmers Mfg. Co., Milwaukee 1, Wis.—A new 144-page indexed catalogue for "pre-engineered" stock Texrope drives which simplifies drive selection so that untrained persons can readily specify proper drives, has been announced by this company. It is said to represent one of the most outstanding compilations of engineering data ever assembled for the V-belt industry. Over half of the book is devoted exclusively to pre-engineered stock Texrope drives for all applications from one to 150 horsepower. Drives for all horsepowers, motor speeds, ratios and driven speeds have been accurately pre-engineered and are listed in die-cut pages, indexed according to horsepower. The catalogue is available on request. Another new bulletin issued by this company is descriptive of its defiberizer and inter-plane grinder, machines for helping conserve forest products by using waste timber. The defiberizer, which is designed to reduce wood into fine, wooly fiber bundles, and the inter-plane grinder, a high speed vertical attrition mill, are both covered by descriptive data and drawings. Flow sheets showing the arrangement of equipment used in connection with these machines for recovering wood waste are included. Ask for Bulletin No. 26B6428.

Bailey Meter Co., 1050 Ivanhoe Road, Cleveland 10, Ohio—A new bulletin, No. 1022, "Control for Spreader Stokers" has been issued. It gives data on approved automatic control layouts for spreader stokers, and explains the operation of standardized component parts of the Bailey control system. There are also chart records illustrating the performance of a complete system with automatic fuel-air ratio control, and diagrammatic drawings, showing the complete Bailey combustion control and the Bailey parallel control. Also available from this company is Bulletin 105-B, on the "Bailey Three-element Feed Water Control." In this bulletin are listed the advantages of the three-element system. Chart records illustrate operations under difficult conditions. A list of users, including paper mills, is given. The 16-page, three-color bulletin is completely illustrated with photos and cutaway views.

Dow Corning Corporation, Midland, Mich.—Announcement has been made by this company of a new bulletin "DC Antifoam A," which may be had on request. It describes the physical properties of DC Antifoam A; outlines various methods for using it, and presents methods for determining its efficiency. It also proves, by comparative studies, the economy of DC Antifoam A in contrast to other suppressors. A paragraph is devoted to the use of this silicone antifoam agent in the paper industry.

Electric Machinery Mfg. Co., Minneapolis 13, Minn.—Now available from this company is Publication No. 188, a diecut four-page folder in three colors, which shows cutaway views and details of the construction of the new E-M "Heavy Duty" squirrel-cage induction motors designed for drip and spashproof construction in large-power ratings from 100 to 1000 hp., 1800 rpm and lower.

Farrand Optical Co., Inc., Bronx Blvd. and E. 238th Street, New York 66, N. Y.—In a bulletin No. 801, just prepared, is described a new instrument for research, the ultraviolet monochromator, which will be of interest to chemists and other scientific workers. The bulletin lists six instruments; three models for the spectral region 200 to 800 mu with quartz-lithium fluoride optics and three models for the visual region, 400 to 950 mu with glass optics. Tables of general specifications are also included.

General Electric Co., Chemical Dept., Pittsfield, Mass.—An attractive reference data book on insulating varnishes has been issued by the Resin and Insulation Materials Division of the General Electric Chemical Department. Its 40 pages are devoted to complete technical and application data, including specifications; electrical properties; film properties; cure and aging; chemical properties, and baking and air-drying cycles for each type. Thirty-six grades are described, including those for coating paper.

Hewitt-Rubber Division, Hewitt-Robins, Inc., Buffalo, N. Y.—In a four-page product folder now being distributed by this company, appear specifications and construction features of Monarch brand transmission belting. This type of transmission belting is claimed to be especially effective in pulp and paper mills. The booklet may be obtained by writing to Hewitt Rubber Company, 240 Kensington Ave., Buffalo 5, New York.

Lukens Steel Company, Coatesville, Pa.—An interesting bulletin now available from this company describes its new clad steel line, and gives applications for the most important types of stainless cladding, including those in the paper industtry. The process of producing stainless-clad steel is illustrated, to show how uniformity of cladding thickness is maintained and a permanent bond insured. There are several pages of corrosion data, size and weight tables, and photos. Ask for Bulletin No. 338.

Mica Insulator Company, Box 1076, Schenectady 1, New York—Just published by this company is an informative booklet giving instructions for making gears of Lamicoid, a laminated phenolic plastic, and pointing out the many applications for these gears. Also included are technical tables that give preferred pitches, torque, safe working stresses and other practical information.

Joseph T. Ryerson & Son, P. O. Box 8000-A, Chicago 80, Ill.—Now available from this company is an eight-page illustrated bulletin, which describes a special type of high manganese, high sulphur analysis steel plate developed for applications involving machining. The bulletin gives analysis, physicals and explains machining advantages, also how to weld, and properties developed by case carburizing. Write nearest plant for copy—Chicago, New York, Los Angeles, Milwaukee, Detroit, St. Louis, Cleveland, Cincinnati, Buffalo, Pittsburgh, Philadelphia, Boston.

Sier-Bath Gear & Pump Co., North Bergen, N. J.—A new two-color catalogue giving full information on its Gearex rotary pumps has been issued by this company. The applications of two models of pumps are described in detail. The catalogue also contains selection data, illustrations of both models and a closeup of the rotating element. Cutaway cross-sections of pumping elements illustrate the construction and operation of this new pump. Standard specifications are also included.

Vertex Company, 40-44 W. 4th St., New York 12, N. Y.—A circular, just off the press, describing an edging machine for binding the edges of material with pressure sensitive tape, is available from this company.

Whiting Corporation, Harvey, Ill.—Just published by this company is an eight-page bulletin describing its new line of electric chain hoists. The bulletin describes the operation of the hoists and gives complete specifications, speeds, prices, etc. Ask for Bulletin No. H-100A.

Worthington Pump and Machinery Corp., Harrison, N. J.—Several new bulletins have been published by this company. No. L-802-B2 covers aftercoolers for air and gas; H-620-B26, compressors; W-487-B10B, heavy duty rotary pumps, and No. W-317-B16, freflo pumps, types FL, FLV and FLC. The bulletins include cutaway views, photos and dimension charts.

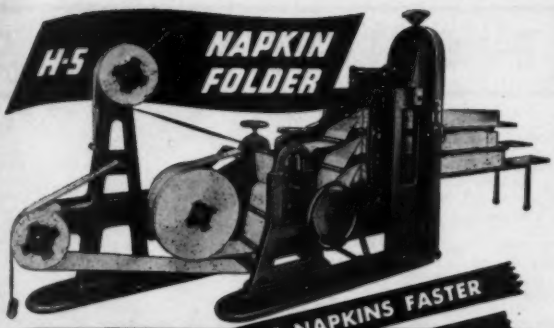
BOOKS

The Statisics of Paper—The data for this book were compiled from material available in the records of the American Paper and Pulp Association. In its compilation, considerable research was undertaken by the Association's Division for Economic Research. Presented as a spiral wire bound monograph with paper cover, the book presents statistical data on pulpwood; wood pulp; waste fibrous materials; and paper, paperboard and paper products. It also summarizes the financial data of the paper industry (1939-1946) and the principal statistics of the industry for the period 1849-1946. In addition to the tabular matter, there are several maps and charts. The monograph concludes with a detailed index of subject content. Priced at $5.00 a copy, the book is available through the American Paper and Pulp Association, 122 East 42nd St., New York 17, N. Y., its publisher.

Accident Prevention Manual for Industrial Operations — This 544-page manual, containing 400 illustrations, charts and tabulations, has been prepared by the engineering staff of the Industrial Division, National Safety Council, with assistance from the Statistical and Transportation Divisions on problems relating to their fields. The major subjects covered in the text are: plant design and layout, construction and demolition, permanent equipment and facilities, guarding and operating machinery, materials handling and storage, electrical hazards, chemical hazards, fire and explosion hazards, flammable liquids, hand and portable power tools, commercial vehicle operation, personal protective equipment, industrial hygiene, and safety organizations and programs. Each of these fourteen major divisions of the book is preceded by a summarizing index for quick location of general topics, while a detailed alphabetical index concludes the volume.

Published by National Safety Council, 20 North Wacker Drive, Chicago, Ill., the book is priced at $7.00 a copy to members of the Council, $14.00 a copy to non-members.

Water Treatment and Purification (Second Edition)—In this volume, the author, William J. Ryan, in simple terms and with many diagrams and illustrations, describes the construction and operation of the different types of water filtering, softening, and treating apparatus, and explains what chemical reactions take place in each treatment. The text covers: The Impurities in Water, Sedimentation and Coagulation, Filtration, Analysis of Water, Lime and Soda-Ash Process, Ion Exchangers, Boiler Feed-Water Treatment-General Considerations, Boiler Feed-Water Treatment-Methods Used, Disinfection of Water, Tastes and Odors, Miscellaneous Treatments, and Prevention of Corrosion. Closing with an appendix and index, the book totals 270 pages, 5½ x 8 in. The price of the book is $2.75 a copy. McGraw-Hill Book Co., Inc., 330 West 42nd Street, New York 18, N. Y. is its publisher.



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CURRENT MARKET QUOTATIONS

RAGS (Domestic)

NEW RAGS

Quotations to consuming mills, cents per pound or dollars per hundred pounds, f.o.b. New York, follow:

(All Prices Are Nominal)

	per cwt.
Blue Overalls	8.50 to 9.00
Corduroy, Men's	5.50 to 6.00
Corduroy, Ladies'	5.25 to 5.75
Washables, No. 1	5.75 to 6.00
Percales	7.00 to 7.25
Light Prints, No. 1	6.50 to 7.00
Khaki Cuttings—	
Bleachable	6.50 to 7.00
Unbleachable	6.00 to 6.50
New White Canvas	10.00 to 10.50
New Mixed Blacks	4.50 to 5.00
Canton Flannels, Bleached	10.50 to 11.00
Shirt Cuttings—	
New White No. 1	11.00 to 11.50
White Shrunk	9.50 to 10.50
Silesias No 1	8.50 to 9.00
New Unbleached	11.50 to 12.00
Fancy	6.50 to 7.00
Linen Cuttings—	
American	9.00 to 10.00
White	15.00 to 16.00
Grey	14.00 to 15.00

RAGS (Domestic)

OLD RAGS

Quotations to consuming mills, dollars per hundred pounds, f.o.b. New York, follow:

(All Prices Are Nominal)

	per cwt.
Roofing—	
No. 1	1.85 to 1.95
No. 2	1.75 to 1.85
No. 3 and No. 4	1.65 to 1.75
Twos and Blues—	
Repacked	3.75 to 4.25
Thirds and Blues—	
Repacked	3.50 to 4.00
Miscellaneous	2.75 to 3.00
Whites, No. 1—	
Repacked	4.75 to 5.25
Miscellaneous	4.00 to 4.50
White, No. 2—	
Repacked	3.75 to 4.25
Miscellaneous	3.25 to 3.50

RAGS (Foreign)

ex dock New York City

NEW RAGS

	per cwt.
New Dark Cuttings	Nominal
New Mixed Cuttings	
New Light Silesias	
Light Flannelettes	
Unbleached Cuttings	
New White Cuttings	
New Light Oxfords	
New Light Prints	

RAGS (Foreign)

ex dock New York City

OLD RAGS

	per cwt.
No. 1 White Linens	Nominal
No. 2 White Linens	
No. 3 White Linens	
No. 4 White Linens	
No. 1 White Cottons	
No. 2 White Cottons	
No. 3 White Cottons	
No. 4 White Cottons	
Extra Light Prints	
Ord. Light Prints	
Med. Light Prints	
Dutch Blue Cottons	
French Blue Cottons	
French Blue Linens	
Checks and Blues	
Linsey Garments	
Dark Cottons	
Old Sheepskins	

ROPE and BAGGING

f.o.b. and ex dock New York City

(All Prices Are Nominal)

	per cwt.
Gunny No. 1—	
Foreign	Nominal
Domestic	4.50 to 4.75
Wool Tares—	
Light	5.00 to 5.25
Heavy	5.25 to 5.50
No. 1 Scrap Bagging	4.00 to 4.50
Manila Rope—	
No. 1 large	6.50 to 6.75
No. 1 small	5.50 to 5.75
Sisal Rope—	
No. 1 large	6.00 to 6.50
No. 1 small	5.50 to 6.00
New Burlap Cuttings	5.50 to 6.00
Jute Threads—	
Foreign (Nom.)	6.50 to 7.00
Domestic	6.00 to 6.50
Strings—	
No. 1 sisal	6.00 to 6.50
No. 2 sisal	5.50 to 6.00
Soft jute	6.00 to 6.50
Mixed	2.50 to 3.00

WASTE PAPER

The following are quotations, dollars per ton, for No. 1 packing f.o.b. New York:

(All Prices Are Nominal)

	per ton
Shavings—	
Hard White Env. Cuts	165.00—
Hard White, No. 1	130.00—
Soft White, No. 1	110.00—
Soft White, One-cut	130.00—
Soft White, Misc.	100.00—
Fly Leaf, No. 1	55.00—
Fly Leaf, Woody, No. 1	45.00—
No. 2 Mixed Col. Woody	35.00—
Flat Stock—	
No. 1 Heavy Books and Magazines	42.50 to 45.00
Mixed Books	35.00 to 37.50
Ledger Stock—	
No. 1 White	80.00 to 85.00
No. 1 Mixed (Colored)	70.00 to 75.00
Manilas—	
New Env. Cuttings	130.00 to 140.00
New Env. Cuts, One-Cut	—
Extra Manilas	—
Manila Tab Cards, Free of Ground Wood	80.00 to 85.00
Colored Manila Tab Cards	65.00 to 70.00
Kraft—	
New Envelope Cuttings	120.00 to 125.00
Tripled Sorted No. 1 100%	70.00 to 75.00
New 100% Cor. Cuts	65.00 to 70.00
No. 1 Old Assorted	55.00 to 60.00
News—	
White Blank	70.00 to 75.00
Overissue	35.00 to 37.50
No. 1 Baled	23.00 to 25.00
Old Corrugated Containers	28.00 to 29.00
New Corrugated Cuts	37.00 to 38.00
Mill Wrappers	27.00 to 28.00
Box Board Chips	18.00 to 19.00
No. 1 Mixed Paper	19.00 to 20.00

CHEMICALS

f.o.b. shipping point

(All Prices Are Nominal)

Alum (Papermakers)—	
Lump, cwt.	4.25—
Ground, cwt.	4.00—
Powdered, cwt.	4.40—
Blanc Fixe—	
Pulp, bulk, ton	$55.00—
Dry, barrels, pound	07.50—
Bleaching Powder—	
Drums, cwt.	2.75 to 3.25
Casein (Domestic Standard)	
20-30 mesh (bags), lb.	
80-100 mesh (bags), lb.	25.00 to 26.00
Argentine, lb.	26.00 to 27.00
China Clay—	
Domestic Filler Bulk (mine) ton	8.50 to 15.00
Domestic Coating Bulk (mine) ton	12.00 to 22.00
Imported (ship side) Bulk (lump) ton	22.00 to 25.00
Chlorine—	
Tank cars (wks) cwt.	2.00 to 2.25
Gelatine (silicin), lb.	1.00 to 1.65
Glye. (C.P.) drums, lb.	.50 to .59½
Litharge, powd., bbl., lb.	16 to 16½
Rosin (Gum)—	
New York, per 100 lbs.	
E	8.25—
F	8.25—
G	8.22—
WW	9.55—
Rosin (Wood), carlots	7.50—
Salt Cake—	
Dom. bulk (wks) ton	22.00 to 24.00
Imp. bulks on dock—(Atl. ports) ton (Nom.)	25.00 to ——
Soda Ash—	
Bulk (works), cwt.	1.00 to ——
Paper Bags, cwt.	1.20 to 1.35
Barrels, cwt.	1.35 to 1.60
Soda (Caustic)—	
Solid, drums, cwt.	2.50—
Ground and flake, drums, cwt.	2.90 to 3.00
Sodium Silicate—	
60 deg., 55 gal. drums, (works) cwt.	1.65 to 2.05
40 deg., 55 gal. drums, (works), cwt.	.80 to 1.45
Starch—	
Pearl, 140 lb. bags, cwt.	4.67—
Pearl, barrels, cwt.	4.78—
Paper (Sp.) bags, cwt.	4.78—
Powdered, barrels, cwt.	4.78—
Sulphur (Crude)	
(Mine) bulk, long ton	16.00 to —
Talc—	
Dom. 100 lb. bags (mine) ton	16.00 to 28.00
Canadian	35.00 to 45.00
Titanium Dioxide—	
Barium Pig., bbls., lb.	.06¼ to .06¾
Calcium Pig., bbls., lb.	.06 to .06½
Zinc Sulphide, bbls., lb.	10.00 to 10.25

WOOD PULP

Prices, dollars per short, air dry, ton, on dock American ports and f.o.b. shipping points with former OPA freight allowances, are:

(All Prices Are Nominal)

Bleached sulphite, Swedish	150.00 to 160.00
Bleached sulphite, Finnish	165.00—
Bleached sulphite, dom.	120.00 to 125.00
Easy bleaching sulphite	—
Unbleached sulphite, Swed.	120.00 to 140.00
Unbleached sulphite, Fin.	132.50—
Unbleached sulphite, dom.	115.00—
Unbleached kraft, Swedish	115.00 to 140.00
Unbleached kraft, Finnish	132.50—
Unbleached kraft, northern	105.00 to 112.50
Unbleached kraft, southern	90.00—
Bleached sulphate, Swedish	150.00 to 165.00
Bleached soda, domestic	120.00 to 125.00
Sulphite screenings, dom.	—
Sulphate screenings, dom.	—
Groundwood, domestic and Canadian	80.00 to 85.00

PAPER

f.o.b. New York City

(All Prices Are Nominal)

Boards—	
Binders	94.00—
Chip	73.00—
Chip, tube and can	75.00—
Chip, full blending	77.50—
Chip, sgl. mla. lined	80.00—
Coated, white patent .018	101.50—
.020 and heavier	90.00—
Kraft liner	79.00—
Filled News	75.00—
Container	90.00—

Book Papers—f.o.b. mill with quantity, weight, manufacturing and other differentials allowed:

Uncoated (Unirimmed)

Book, White (M. F.)—	
A Grade E. F.	10.60—
B Grade E. F.	—
C Grade E. F.	—
D Grade E. F.	—
No. 2 Uncoated Offset 4 sides, White	—

Coated White (Trimmed 4 sides)

No. 1 Glossy	14.70—
No. 2 Glossy	—
No. 3 Glossy	—
No. 4 Glossy	—
C2S Offset	—
C1S Litho (Varnish)	—
C1S Litho (Non-Varnish)	—

Writing Papers—f.o.b. mill with name, quantity, packing and other differentials allowed:

	per cwt.
Rag Content Bond—	
Extra 100% Rag	39.75—
100% Rag	32.85—
75% Rag	—
50% Rag	—
25% Rag	—

	per cwt. Zone 1
Rag Content Ledger—	
Extra 100% Rag	40.90—
100% Rag	34.00—
85% Rag	—
75% Rag	—
50% Rag	—
25% Rag	—
Sulphite Bond—	per cwt.
Air dry, watermarked	—
No. 1 (M.F.) watermarked	12.00—
No. 2 (M.F.) watermarked	11.25—
Plain (M.F.) unwatermarked	—
Sulphite Ledger—	per cwt. Zone 1
No. 1 (M.F.) watermarked	13.15—
No. 2 (M.F.) watermarked	12.25—
Plain (M.F.) unwatermarked	—
Glassine (f.o.b. mill)—	per cwt.
Embossed (25 lbs. up)	—
Bleached (25 lb. up)	—
Unbleached (25 lb. up)	—
Greaseproof— Bleached (25 lb. up)	—
Unbleached (25 lb. up)	—
News—	per ton
Rolls, Standard (Contract)	90.00—
Rolls (Spot)	(Nominal)
Sheets	109.00—
Tissues (Carlots)—	per ream
White No. 1	1.65—
White No. 2	1.55—
Bleached Anti-Tarnish	—
Colored	—
Anti-Tarnish Kraft	1.85—
Manilla	1.45—
Napkins, semi-crepe (12½ lb. to M shts.) per cs.	.80—
Napkins, full crepe and emb'sed (12½ lb. to M shts.) per cs.	.80—
Toilet, Bleached (M shts.) per cs.	7.50—
Toilet, Unbleached (M. shts.) per cs.	6.00—
Towels—	per case
Bleached	4.50—
Unbleached	4.00—
Wrappings (Kraft)—	per cwt.
Super-Standard	7.00 to 7.50
No. 1 Wrapping	6.50 to 7.00
Standard Wrapping	6.25 to 6.75
Standard Bag	6.25 to 6.75
Variety Bag	—
Wrappings (Sulphite and Bleached Kraft)— (Rolls, f.o.b. mill)	
Bleached Papers—	per cwt.
M.F. & M.G. Waxing, 30 lb. (Carloads only (10,000 lbs.)	—
Drug wrapp., 35 lb.	—
Unbleached Papers—	
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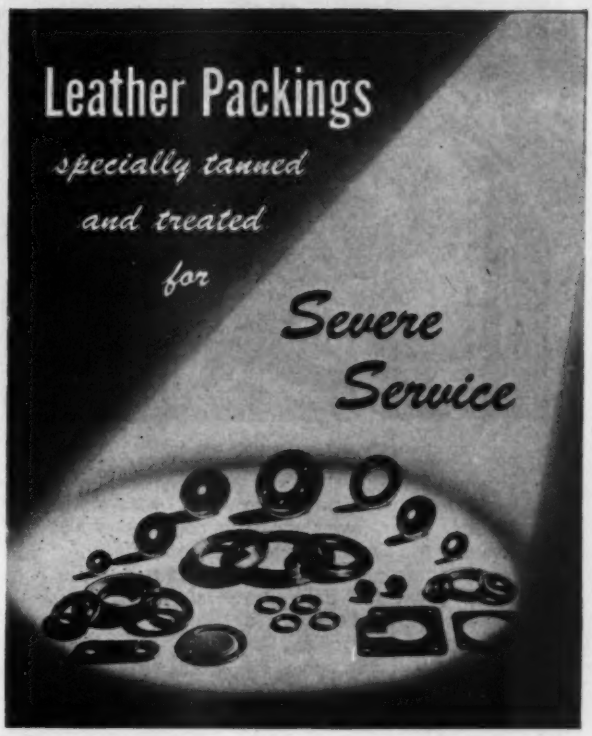

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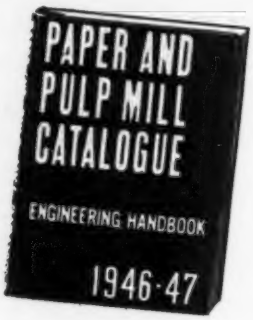

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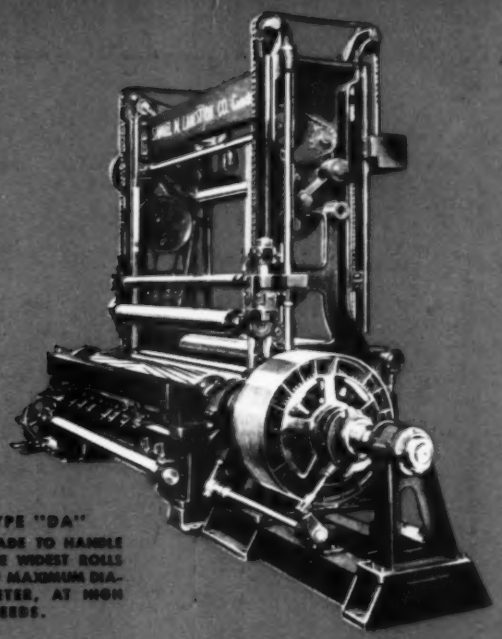

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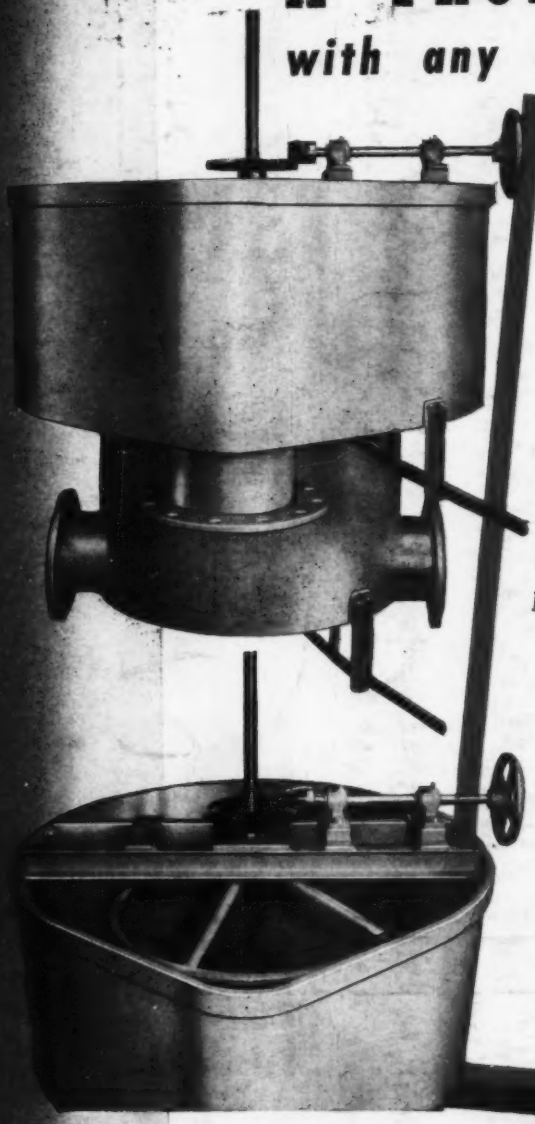

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